Clinical paper

A survey of team culture and learning organization in the resuscitation of neonates with congenital anomalies: A single center experience

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Abstract

Aim: Delivery room resuscitation of neonates with congenital anomalies is complex. This study aimed to assess survey psychometrics and measure learning organization culture among resuscitation team members in a pediatric hospital delivery room dedicated to neonates with congenital anomalies.

Methods: We administered the Short-Form Learning Organization Survey with the addition of an open-ended question to all delivery room resuscitation team members from 5/2023 to 7/2023. Psychometric properties were assessed to confirm the survey's reliability and validity in the delivery room context. Total and subscale scores were calculated, and differences were assessed by clinical role. The open-ended qualitative data were analyzed using an inductive approach and coded for theme and valence (positive, negative, neutral).

Results: The response rate was 52% (159/307) with all roles represented. Psychometric assessment produced a 25-item survey with high reliability and validity. There were no differences in total scores across roles. Nurses had higher scores compared to attending physicians ($p < 0.01$) and advanced practice providers ($p < 0.05$) for the supportive learning environment subscale, and advanced practice providers ($p < 0.05$) for the training subscale after multiple comparisons adjustment. Qualitative analysis revealed seven themes: time constraint, environment, adequate staffing, different opinions, care deviations, leadership, and training. Valence analysis showed variation by role, with more positive nursing responses.

Conclusion: The refined 25-item Short-Form Learning Organization Survey is a reliable and valid measure of learning organization culture for neonatal resuscitation teams. Differences in subscale scores and qualitative valence across roles highlight opportunities to improve interprofessional learning organization and team culture.

Keywords: Delivery Room resuscitation, Neonatal resuscitation, Congenital anomalies, Learning organization culture, Learning organization survey

Introduction

Congenital anomalies affect approximately 3% of births and are the leading cause of neonatal death in the United States.[1,2] Delivery room (DR) resuscitation of neonates with congenital anomalies is complicated and requires detailed planning, trained personnel, and specific expertise.[3–5] Within this complex setting, a strong culture of learning is essential to optimize team performance and patient outcomes. Yet, the culture and learning environment surrounding resuscitation for neonates with congenital anomalies has not been systematically assessed.

A key component of the team environment is organizational culture, defined as the shared beliefs, perceptions, and values within an organization (or team).[6–8] One aspect of organizational culture is organizational learning, which is defined as growth through knowledge creation, knowledge acquisition, and knowledge transfer.[9,10] The process of organizational learning often includes a collective cycle of action and reflection.[9,10] Both industry[11] and healthcare[12–14] identify organizational culture and learning as key factors in performance improvement.[12] In healthcare, longitudinal studies assessing organizational culture have shown culture influences performance.[12,15] Additionally, efforts to improve the learning environment, leadership, and psychological safety have resulted in better patient outcomes, including lower mortality,[14] more favorable patient safety culture,[13] and improved effective communication.[16] In neonatal resuscitation, prior studies investigating attributes that positively influence team performance have highlighted the importance of leadership, open communication, and peer-to peer support.[17–19] These studies evaluated distinct characteristics and did not conduct a holistic evaluation of learning organization culture within DR resuscitation. Furthermore, these studies did not evaluate resuscitations of neonates with congenital anomalies.

Measures capturing and data reflecting learning organization culture in high risk, high intensity environments are lacking. While the Short-Form Learning Organization Survey (LOS-27)[10] has been used to measure learning organization in various settings, including healthcare[10], education,[20] and professional sports,[21] it has not been applied to high acuity contexts such as neonatal resuscitation. Thus, the aims of this study were to first assess the psychometric properties of the LOS-27 in neonatal resuscitation and subsequently measure learning organization culture among resuscitation team members in a quaternary pediatric hospital with a special delivery unit (SDU) dedicated to neonates with congenital anomalies.

Methods

Survey instrument and adaptation

To measure learning organization culture, we employed the LOS-27, a 27-question survey adapted from the 55-question Learning Organization Survey (LOS) published in the Harvard Business Review.[22] The LOS focuses on three building blocks to enable organizations to comprehensively assess their learning abilities: a supportive learning environment, concrete learning processes and practices, and leadership that reinforces learning.[22] The LOS benchmark data were derived from surveys of senior executives across a variety of industries.[22] The LOS-27 was adapted and validated by Singer et al. in the healthcare setting using survey responses from the Veterans Health Administration employees.[10] The LOS-27 captures multiple dimensions of organizational learning[10] with seven subscales: supportive learning environment, leadership that reinforces learning, experimentation, training, knowledge acquisition, time for reflection, and performance monitoring. The Children's Hospital of Philadelphia (CHOP) Institutional Review Board deemed this study to be exempt (IRB 22-020610).

The language of the survey questions was adapted for the neonatal DR resuscitation context. The words "this workgroup" were changed to "the Neonatal Special Delivery Unit (SDU)" to ensure participants knew to which clinical unit the questions were referring. An additional open-ended question was added at the end of the survey, with the goal of soliciting further feedback on learning organization culture in this DR environment. The question was, "Please describe any other thoughts you would like to share about the Neonatal SDU as a learning organization and/or about the Neonatal SDU culture in general." The survey also included demographic questions regarding clinical role and years of experience in that role. The full survey can be found in Appendix 1.

Study population and survey administration

The study was conducted at the Children's Hospital of Philadelphia, given its high volume, well established SDU. The SDU was established in 2008 and is the first high-risk delivery unit specializing in neonates with congenital anomalies,[23] delivering approximately 500 neonates per year. The SDU serves neonates with prenatally diagnosed congenital anomalies that require immediate stabilization or surgical evaluation during their birth hospitalization. A wide variety of congenital anomalies are treated at the SDU, including congenital heart disease, lung lesions including congenital diaphragmatic hernia, and myelomeningocele. The study population included clinical team members who resuscitate neonates with congenital anomalies in the SDU. The neonatal team includes advanced practice practitioners (APPs: nurse practitioners, physician assistants, and hospitalists), nurses, neonatology attending physicians and fellows, and respiratory therapists (RT).

We administered the LOS-27 and open-ended question to all clinical team members who participate in SDU resuscitations. Participants were recruited via emails and flyers posted throughout the unit in work rooms. Written informed consent was obtained prior to survey completion using an electronic REDCap[24] form.

Psychometric assessment

We assessed psychometric properties of the LOS-27 in this population and context to ensure the survey was a reliable and valid instrument to capture the learning organization culture of the neonatal DR resuscitation team. Reliability refers to the ability of an instrument to consistently measure a construct.[25] We evaluated reliability using Cronbach's α and Pearson correlation coefficients, calculating values for the entire survey and seven subscales. The threshold for adequate subscale reliability (internal consistency) was a Cronbach's α of 0.7.[25] We assessed Pearson correlation coefficients between and within each subscale, considering coefficients of 0.5–0.75 to indicate moderate reliability, 0.75–0.9 good reliability, and 0.9–1 excellent reliability, with 1 indicating perfect consistency.[26]

Construct validity assesses the degree to which a group of items measure the same concept. We used the Lavaan package[27] in R to complete a Confirmatory Factor Analysis to assess construct validity. The Confirmatory Factor Analysis was completed using structural equation modeling, based on the seven subscales described by Singer et al.[10] As recommended by Stevens,[28] items were evaluated for loading coefficients greater than or equal to 0.40 for a given factor. Items near the loading coefficient cutoff threshold were evaluated further for goodness-of-fit and face validity. Goodness-of-fit was evaluated using (1) the overall chi-squared, (2) standardized root mean square residual (SRMR), (3) the root mean square error of approximation (RMSEA), and the (4) comparative fit index (CFI) and the Tucker-Lewis fit index (TLI).[29] Table S1 in Appendix A further describes the criteria utilized to evaluate goodness-of-fit.

Analysis of scores

Survey item responses (assessed on a 5- or 7-point Likert scale) were transformed to a 100-point scale, accounting for reverse coded

items. Only complete survey responses were analyzed. Scaled scores were used to calculate summary statistics for total and subscale scores across all roles, with higher scores indicating more positive perceptions of learning organization culture.

The Kruskal-Wallis test was used to assess differences in total and subscale scores across roles. The Wilcoxon Rank Sum test was used in a pairwise fashion to assess statistical differences between pairs of roles, and the reported p-values incorporated a Bonferroni correction to account for multiple comparisons. All statistical analyses were conducted in R Statistical Software (v4.3.1).[30]

Qualitative analysis

The open-ended responses were analyzed using a qualitative inductive approach.[31] The initial coding was conducted independently by two authors (a PhD Human Factors engineer and a Research Coordinator), and two additional authors (Research Assistants) confirmed codes. All four authors met after initial coding to refine analyses and group findings into themes. All authors underwent training prior to qualitative analysis. Responses were additionally analyzed to identify the valence of responses (positive, negative, or neutral) by role.

Results

Demographics

The survey was distributed to 307 eligible participants between 5/2023 and 7/2023 with 159 responses (52%) and 128 complete responses (42%) (Table 1). The plurality of the respondents were nurses, followed by APPs and attending physicians (Table 1). Among complete responses, the majority had 1–5 years of experience participating in neonatal resuscitations (Table 1). There were 41 respondents who answered the open-ended question.

Psychometric assessment

Based on iterative psychometric assessments, two items, questions 22 and 27, were dropped from the analysis (Table 2). These items decreased the reliability (Cronbach's α) for the knowledge acquisition and performance monitoring subscales and did not adequately load with other subscale items in the factor analysis. This refinement led to a 25-item survey and retained the seven-dimensional model of organizational learning (Table 2).

The refined, 25-item version demonstrated high overall reliability (Cronbach's α = 0.91) and good subscale reliability (Cronbach's α = 0.76–0.91) (Table S2). Correlations between the subscales were low (Pearson correlation = 0.05–0.59) (Table S2), indicating that subscales were not highly correlated (overlapping) and measured distinct aspects of learning organization culture.

The Confirmatory Factor Analysis using the seven LOS-27 subscales produced item loadings ranging from 0.43 to 0.94 with two items below the 0.4 threshold, which were dropped (Table 2). The Confirmatory Factor Analysis indicated adequate construct validity based on goodness-of-fit statistical parameters being at or near goals: overall chi- square = 479.8, p-value = 0.000 [goal parameter $p < 0.05$], SRMR = 0.08 [goal parameter < 0.05], RMSEA = 0.08 [goal parameter < 0.08], CFI = 0.90 [goal parameter > 0.90], and TLI = 0.90 [goal parameter > 0.90].

Survey scores

Scaled total and subscale scores are reported in Fig. 1. The median total score was 79.1 (range: 72.4, 85.1). The median subscale scores ranged from 61.9 to 85.7, with the highest scoring subscales: time for reflection, supportive learning environment, and experimentation.

Comparison by clinical role

Scaled total and subscale scores stratified by clinical role are displayed in Fig. 2. Total scores were not statistically different across roles (Fig. 2A). However, two subscale scores differed by role. For the supportive learning environment subscale (Fig. 2B), nurses had higher scores (median 87.8 [range: 59.2, 100]) compared to attending physicians (median 79.6 [range: 42.9, 98], adjusted p-value = 0.007) and APPs (median 79.6 [range: 55.1, 100], adjusted p-value = 0.013). Nurses also had higher scores (median 85.7 [range: 57.1, 100]) in the training subscale compared with APPs (median 76.2 [range: 42.9, 100], adjusted p-value = 0.015) (Fig. 2C).

Qualitative analysis

Of the responses to the open-ended question, 113 individual quotes were identified. Analysis of the quotes identified seven themes: time constraint, environment, adequate staffing, different opinions, care deviations, leadership, and training. Table 3 presents a summary of the themes, definitions, and representative quotes. Valency

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Table 1 – Demographics of survey respondents.

	Total Surveyed Population (N = 307)	All Survey Respondents (N = 159)	Complete Responses (N = 128)
Role			
Attending	64 (20.8%)	30 (18.9%)	28 (21.9%)
Fellow	21 (6.8%)	14 (8.8%)	12 (9.4%)
APP	90 (29.3%)	40 (25.2%)	29 (22.7%)
Nurse	91 (29.6%)	50 (31.4%)	39 (30.5%)
RT	41 (13.4%)	25 (15.7%)	20 (15.6%)
Years of Experience			
1–5 years		98 (61.6%)	79 (61.7%)
6–10 years		32 (20.1%)	24 (18.8%)
11–15 years		29 (18.2%)	25 (19.5%)

APP (advanced practice provider; includes physician assistants, nurse practitioners, and hospitalists).

RT (respiratory therapist).

Table 2 – Survey items and factor analysis results of LOS-27.

Subscales	Factor Loadings
Supportive learning environment	
1. In the Neonatal SDU, people value new ideas	0.726
2. Differences in opinions are welcomed in the Neonatal SDU	0.906
3. In the Neonatal SDU, people are open to alternative ways of getting work done	0.792
4. People in the Neonatal SDU are eager to share information about what doesn't work as well as to share information about what does work	0.668
5. The Neonatal SDU engages in productive conflict and debate during discussions	0.693
6. In the Neonatal SDU, we frequently identify and discuss underlying assumptions that might affect key decisions	0.634
7. If you make a mistake in the Neonatal SDU, it is often held against you*	0.436
Leadership that reinforces learning	
8. My leader(s) establish(es) forums for and provide(s) time and resources for identifying problems and organizational challenges	0.808
9. My leader(s) establish(es) forums for and provide(s) time and resources for reflecting and improving on past performance	0.767
10. My leader(s) listen(s) attentively	0.916
11. My leader(s) invite(s) input from others in discussions	0.898
Experimentation	
12. The Neonatal SDU experiments frequently with new product/service offerings	0.805
13. The Neonatal SDU experiments frequently with new ways of working	0.918
14. The Neonatal SDU frequently employs pilot projects or simulations when trying out new ideas	0.603
15. The Neonatal SDU has a formal process for conducting and evaluating experiments or new ideas	0.527
Training	
16. Experienced team members in the Neonatal SDU receive training when shifting to a new position	0.749
17. Experienced team members in the Neonatal SDU receive training when new initiatives are launched	0.821
18. New team members in the Neonatal SDU receive adequate training	0.690
Knowledge acquisition	
19. The Neonatal SDU has forums for meeting with and learning from: Experts from outside the organization	0.816
20. The Neonatal SDU has forums for meeting with and learning from: Experts from other departments/teams/divisions	0.739
21. The Neonatal SDU has forums for meeting with and learning from: Patients/Families	0.783
22. The Neonatal SDU regularly conducts debriefs and post-delivery reviews	Dropped
Time for reflection	
23. There is simply no time for reflection in the Neonatal SDU*	0.879
24. In the Neonatal SDU, people are too busy to invest time in improvement*	0.694
Performance monitoring	
25. The Neonatal SDU frequently compares its performance with: Best-in-class organizations	0.944
26. The Neonatal SDU frequently compares its performance with: Other hospitals with similar delivery units	0.891
27. The Neonatal SDU consistently collects information on technological trends	Dropped

LOS (Learning Organization Survey).

SDU (Special Delivery Unit).

Goal factor loading > 0.4; items below 0.4 were dropped from analysis.

* Reverse coded item.

analysis demonstrated variation by role. Overall, responses from nurses, RTs, and fellows were more positive, while APP and attending physician responses tended to be negative. Fig. 3 shows valence analysis by clinical role for the 76 quotes coded as positive or negative.

Discussion

To our knowledge, this is the first study to assess learning organization culture in a high acuity setting using the LOS-27. Through psychometric assessment, we found a refined 25-item LOS-27 to be a reliable and valid tool to assess learning organization culture among an interprofessional neonatal resuscitation team. The differences seen in both the quantitative and qualitative data between clinical roles highlight potential opportunities for interprofessional learning and enhanced team performance.

We chose to assess the psychometrics of the LOS-27 given its application in a new population and high intensity work environment. The assessment resulted in a reliable and valid 25-item survey with seven distinct subscales, which mirror the published LOS-27 subscales. The two removed items that did not load in our analyses were item 22, which asked about post-event debriefs and loaded on the knowledge acquisition subscale in the original LOS-27, and item 27, which asked about collecting information on technological trends and loaded onto the performance monitoring subscale in the original LOS-27. These two items may have had different perceptions by the neonatal resuscitation team as compared to the population studied by Singer et al.[10] Within neonatology, post-event debriefs are conducted for numerous reasons including system and team performance review, education, quality improvement, and provider emotional support. The breadth of reasons for debriefs may have allowed numerous interpretations of item 22 and thus impacted item loading. Additionally, Singer et al reported the factor loading for item
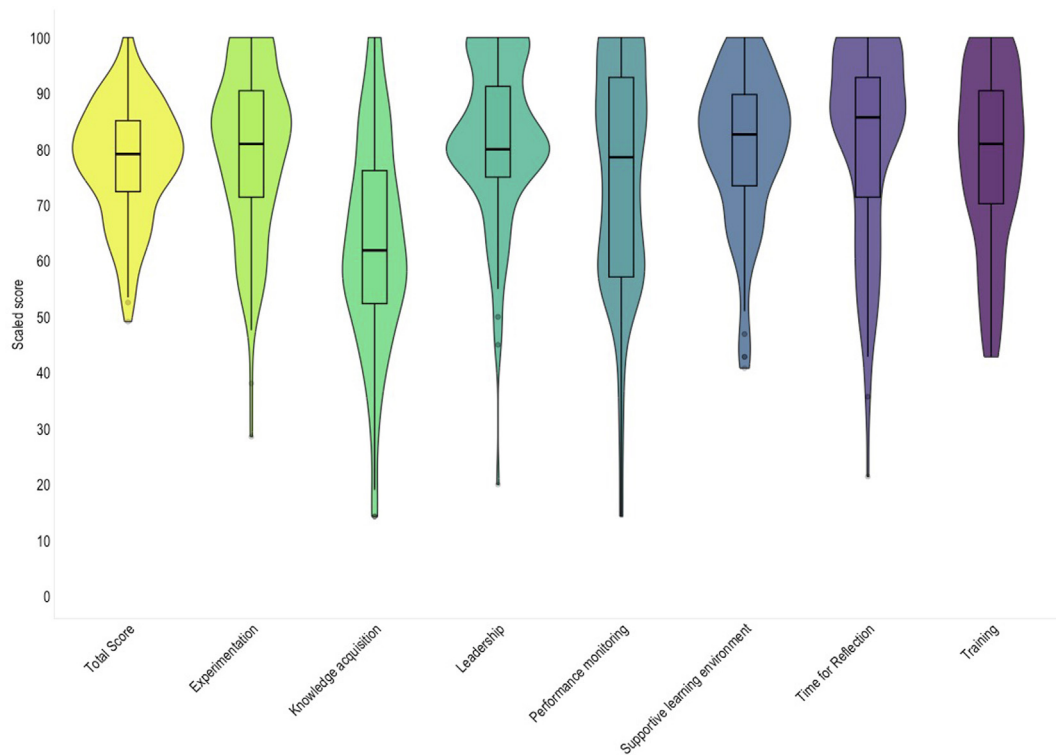
Fig. 1 – Total and subscale scores for the refined LOS-27. Scaled scores are calculated by multiplying each raw score on the seven-point scale by 100 and dividing by seven. For the leadership subscale, which was based on a five-point scale, the divisor was five. The box and whisker plot displays median and interquartile range in the box, the range as the whiskers, and outliers as the individual data points. The violin plot displays distribution of the data around the box and whisker plot. LOS (Learning Organization Survey).

22 as 0.32,[10] which is lower than the 0.40 threshold. This may indicate item 22 does not generally fit well into the subscale knowledge acquisition. Item 27, referring to technologic trends, may not have been relevant to our population as compared to the other population where the LOS-27 has been employed.

Total scores from the refined 25-item LOS-27 in the neonatal DR resuscitation team were high as compared to previously published LOS benchmark scores from other industries.[22] We believe this reflects the strong learning culture of the neonatal DR resuscitation team overall. The differences between interprofessional teams on the subscales and the qualitative valence are notable. The result that nurses had higher supportive learning environment scores than attending physicians and APPs is surprising, given that psychological safety, a component of the supportive learning environment, tends to increase with increasing hierarchical status.[20] The variations in subscale scores by role may be evidence for underlying culture differences and highlight the importance of interprofessional learning and debriefing between clinical roles. Additionally, further investigation is warranted to understand and address the reasons for lower attending and APP subscale scores and negative comments.

While the LOS-27 and associated seven subscales have demonstrated generalizability in the literature,[10,20,21] our study is the first to extend this instrument into the high acuity context of neonatal DR resuscitation. We believe the 25-item version described could be applied to other high acuity teams or settings (e.g., resuscitation, intensive care unit, trauma/emergency care), though dedicated testing is needed. High acuity medical settings require complex interac-

tions between critically ill patients, interprofessional teams including trainees, and equipment/technology, with a near constant stream of information that must be acknowledged, interpreted, and incorporated into care plans. Managing critical patients and integrating information can be challenging and the value of learning organization culture is likely underappreciated in these settings. Current evaluation of care in these high acuity settings is often focused on completion of concrete resuscitation tasks and patient outcomes, rather than the overall learning environment in which this care is provided.[32–35] Our refined 25-item survey can provide a baseline assessment and facilitate intervention planning to improve team performance via organizational learning.

The qualitative analysis of the open-ended responses adds depth to our findings by providing specific feedback and highlighting potential change ideas. The negatively coded responses revealed specific targets for improvements in multiple areas including information dissemination, role delineation, APP training opportunities, and solicitation of feedback. The positively coded responses suggested opportunities to further proactive safety efforts, or Safety II efforts,[36] which focus on promoting what is going well. These opportunities include promotion of pre-resuscitation huddles with explicit role and plan delineation, interprofessional collaboration, and system focused feedback. These data demonstrate the added value of pairing open-ended questions with the LOS-27 to uncover and better understand specific areas for improvement.

We acknowledge study limitations. While the overall response rate was greater than 50%, the complete response rate was 42%
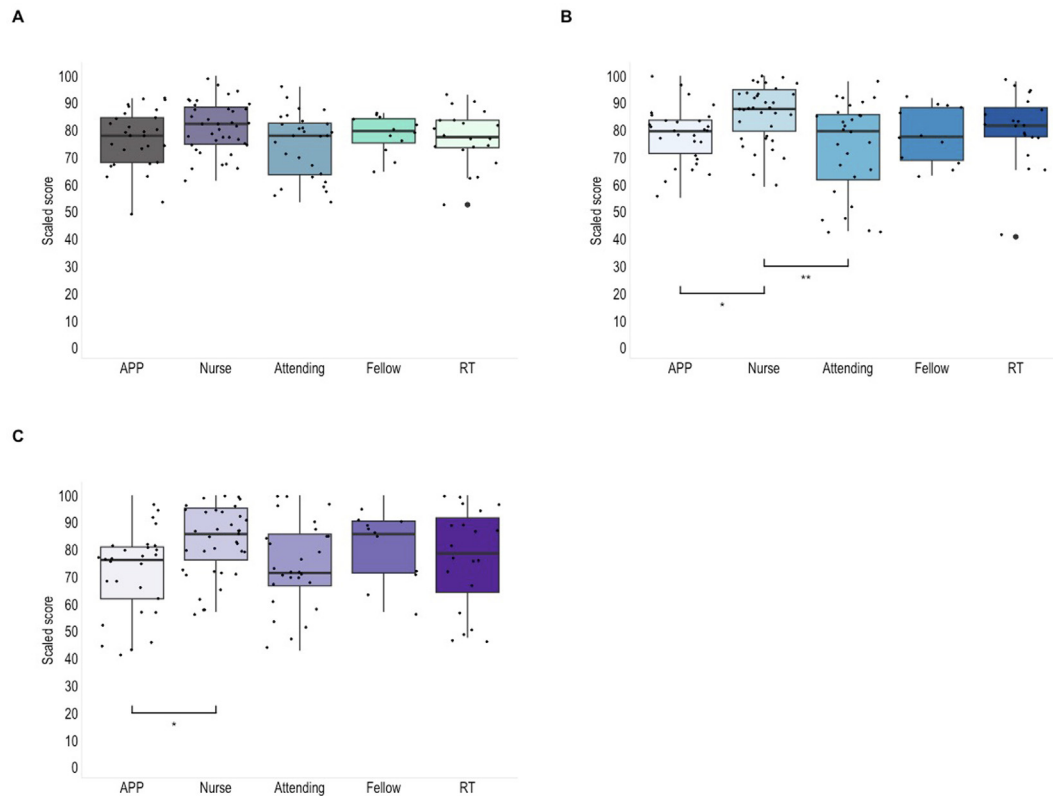
Fig. 2 – Box and whisker plots of total scores and selected subscales by clinical role. The box and whisker plot displays median and interquartile range in the box, the range as the whiskers, and outliers as the individual data points. Wilcoxon Sum Rank used to repeatedly assess differences between two roles (e.g., attending-fellow, attending-APP, etc.). Brackets represent statistically significant differences by role (* = *p* < 0.05, ** = *p* < 0.01 after correcting for multiple comparisons with the Bonferroni correction). Panel A: Total scores. Wilcoxon Sum Rank tests not significant. Panel B: Supportive learning environment. Kruskal Wallis test for any differences *p* = 0.002. Wilcoxon Sum Rank test for nurse-attending adjusted *p* = 0.0075 and nurse-APP adjusted *p* = 0.0136. Panel C: Training. Kruskal Wallis test for any differences *p* = 0.2199. Wilcoxon Sum Rank tests for nurse-APP adjusted *p* = 0.015. APP (advanced practice provider; includes physician assistants, nurse practitioners, and hospitalists) RT (respiratory therapist).

and may not fully represent all team members who participate in neonatal resuscitations. Despite the response rate, all clinical roles were represented in both the quantitative and qualitative data, and the distribution of clinical roles across the total surveyed population and those who responded to the survey are similar. The possibility of response bias exists as those who completed the survey may have more interest in culture, which may inflate scores, or have strong opinions (positive or negative, as evident in the open-ended question data) that are not representative of the entire team. Culture is context specific, and our specific findings and scores may not be generalizable to other teams or units as this survey was conducted at a single center with a specialized delivery unit dedicated to the resuscitation of neonates with congenital anomalies. We do, however, believe the refined 25-item survey may be generalizable to and useful in other high acuity settings and resuscitation contexts, though further evaluation in these settings is warranted.

In the future, we plan to augment these data through neonatal resuscitation team member interviews designed from both the quantitative and qualitative survey responses, with a focus on learning environment and its components: psychological safety and open mindedness. Additionally, we are exploring ways to improve APP training and exposure to the DR, modeling it after nursing training initiatives given their high scores in the training subscale.

Conclusion

We successfully assessed survey psychometrics and measured learning organization culture of DR resuscitation teams who care for neonates with congenital anomalies using a psychometrically sound adaption of the LOS-27 at a single institution. Through psychometric testing, we showed reliability and validity of the 25-item version of the LOS for neonatal DR resuscitation. We demonstrated that overall, the neonatal resuscitation team has strong culture at baseline. We did find differences in the subscales and qualitative valences by role that highlight the importance of opportunities to improve interprofessional learning organization and team culture.

Table 3 – Themes, definitions, and representative quotes with valence from qualitative analysis.

Qualitative Responses by Theme	Role	Valence
Time constraint: preparation time, time spent away from the unit, and challenges associated with limited availability		
I believe the SDU has always been a place, at least for me, where we have a plan for every patient we see coming in and [are] always prepared respiratory wise with our equipment.	RT	Positive
As [APP]s, we often don't have a ton of time to prepare for deliveries. If we don't have someone specifically assigned to the SDU [APP] role, we are pulled from a team last minute, where we are taking care of patients in the unit and have minimal time to become familiar with the patient.	APP	Negative
Environment: physical and cultural environment		
I love being a NICU SDU RN. The teamwork and communication are always smooth. The huddle before the delivery is extremely helpful in identifying clear roles, expectations, and introducing people who may not know each other to ensure a smooth resuscitation.	Nurse	Positive
Emphasis is always placed on system improvements and never on identifying mistakes of individuals, creating a supporting learning environment.	Nurse	Positive
With a large [APP] group it is hard to frequently go to establish being comfortable.	APP	Negative
Adequate staffing: having enough personnel for each role, having dedicate role for the neonatal SDU		
Essentially it feels as though we go, and depending on how critical the delivery [is], we either are just there for being there sake, or we prep lines for the fellows to take over doing. If we aren't going to be doing much, then we shouldn't have to go unless [we are] truly going to be utilized.	APP	Negative
Team members always work within their scope but may perform a task typically performed by another role if more hands were available	Nurse	Neutral
Different opinions: different points of view of the various roles in the neonatal SDU		
After these changes are made, there are some missed opportunities to evaluate whether the changes actually were associated with improved patient outcomes.	Attending	Negative
I would like to see more solicitation of ideas from providers who may currently practice elsewhere or have previous experience with deliveries in general. I feel like maybe sometimes these individuals are an untapped resource that could be valuable in providing insight to shape practice guidelines.	APP	Neutral
Care Deviations: deviations from routine care due to being a highly specialized unit		
Being a highly specialized unit, I think at times routine resuscitation/NRP and general standard of newborn care are sometimes missed. There tends to be many interventions given when not always indicated.	APP	Negative
While Optimal Care Guidelines are built to establish consistent care amongst patients, doing so inherently limits 'out of the box' thinking/new suggestions, as the expectation for care is to follow the pre-approved guidelines	APP	Negative
Leadership: leadership culture, established norms, and change culture		
I do think the SDU leadership is consistently trying to move practice forward.	Attending	Positive
The culture in the SDU has incredible variability depending on the attending present at delivery (both positive and negative). I find this difficult to navigate at times, and it can be unnerving to not know what environment you are walking into.	Nurse	Negative
Very hierarchical organizational structure. Very difficult to change established norms, but that ability is very dependent on who is suggesting a change.	Attending	Negative
Training: perspectives on different types of training and barriers to training		
Our training program for new RNs is very thorough with several hands-on sims. The SDU has evolved with time in matters of technology and trials.	Nurse	Positive
The SDU is a supportive learning environment however often not enough procedures for the number of trainees to get adequate experience	APP	Negative
As an APP, there should be more thorough orientation to the SDU and what the expectations are regarding our role. It can be intimidating coming into the environment without any formal orientation to the unit.	APP	Negative

SDU (Special Delivery Unit).

APP (advanced practice provider; includes physician assistants, nurse practitioners, and hospitalists).

RT (respiratory therapist).

CRediT authorship contribution statement

Anna Bostwick: Writing – original draft, Validation, Software, Resources, Project administration, Formal analysis, Data curation. **Anne Ades:** Writing – review & editing, Supervision, Resources, Project administration, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Carolina Rodriguez-Paras:** Writing – review & editing, Validation, Formal analysis. **Madeline Dombroski:** Writing – review & editing, Validation, Formal analysis, Data curation. **Charis Lim:** Writing – review & editing, Validation, Formal analysis, Data curation. **Maria Ordoñez Paredes:** Writing – review & editing, Validation, Formal analysis, Data curation. **Lauren Heimall:** Writing – review & editing, Data curation. **Leane Soorikian:** Writing – review & editing, Data curation. **Sara C. Handley:** Writing – review & editing, Supervision, Methodology, Investigation, Funding acquisition, Formal analysis. **Heidi M. Herrick:** Writing – review & editing, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.
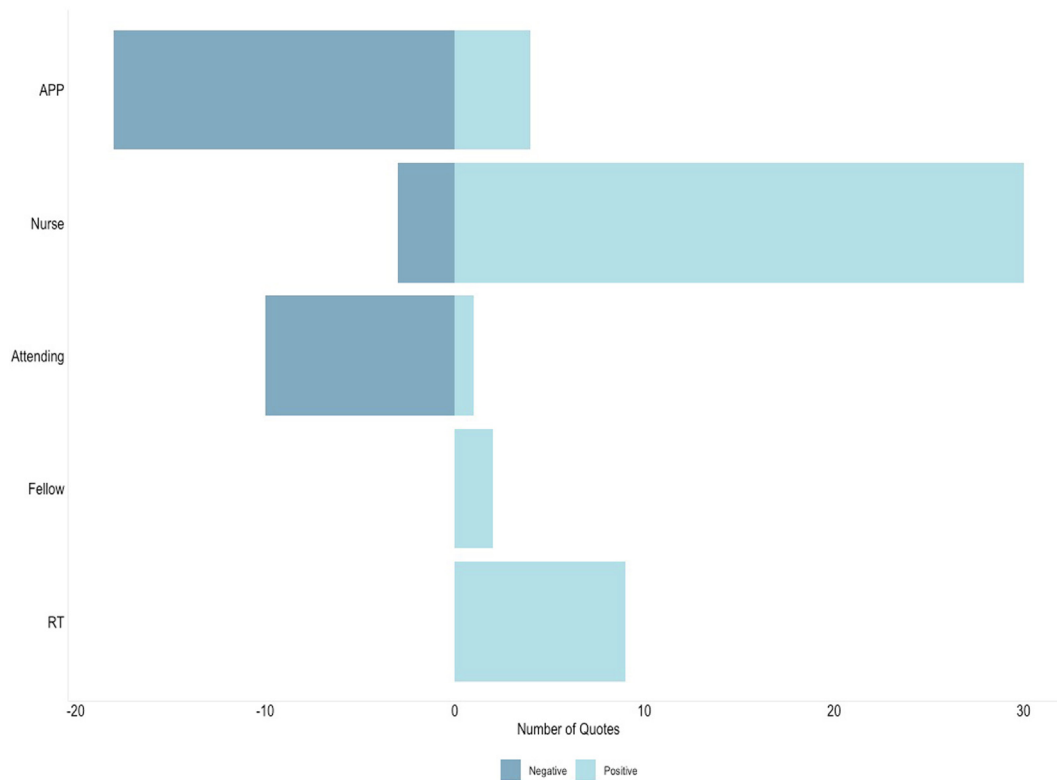
Fig. 3 – Frequency of negative and positive qualitative responses by clinical role. Neutral responses are not included. APP (advanced practice provider; includes physician assistants, nurse practitioners, and hospitalists). RT (respiratory therapist).

Declaration of competing interest

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.

Acknowledgements

Appendix A. Supplementary material

Supplementary material to this article can be found online at https://doi.org/10.1016/j.resplu.2025.100877.

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