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# Perception of Patient Safety Culture in Pediatric Long-Term Care Settings

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## ABSTRACT

**Introduction:** Patient safety culture (PSC) is an emerging construct in adult long-term care settings. No measures are validated to quantify PSC in pediatric long-term care (pLTC) settings despite the importance of safety for this vulnerable population. The study purposes are to (1) describe PSC in pLTC, (2) assess the relationship of PSC to facility recommendation and overall safety rating, and (3) test the stability and reliability of the PSC survey over time.

**Methods:** A modified Nursing Home PSC (NHSPSC) survey was administered to employees at three pLTC facilities over 3 years; data were summarized and compared over time.

**Results:** In all, 208 surveys were completed. Staff perceptions on “*feedback and communication about incidents*” and “*overall perceptions of resident safety*” were most positive and associated with responses of recommending the facility and high overall ratings for child safety ( $p < .05$ ).

**Conclusions:** The modified NHSPSC survey was reliable by Cronbach alpha and findings were consistent over time in these pLTC settings. This tool may be a useful adjunct to safety initiatives in pLTC. Knowledge derived from this survey can provide actionable information for consumers, pLTC employees, managers, and administrators.

**Keywords:** patient safety culture, pediatrics, long-term care, organizational learning

## Introduction

### Background

The importance of patient safety culture (PSC) has been increasingly recognized in acute care settings but is still an emerging construct in long-term care settings. Patient safety culture is defined as “the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization’s health and safety management.”<sup>1</sup> The Agency for Healthcare Research and Quality has created measures quantifying this “product” as comprised of the following dimensions: “teamwork,” “staffing,” “compliance with procedures,” “training and skills,” “nonpunitive response to mistakes,” “handoffs,” “feedback and

communication about incidents,” “communication openness,” “supervisor expectations and actions,” “overall perceptions of safety,” “management support,” and “organizational learning.” A culture of safety is associated with more complete delivery of care and better patient outcomes, such as fewer pressure ulcers, health care–associated infections, and falls.<sup>2,3</sup> These findings, however, are derived primarily from adult, acute care settings.

### Problem

Children and transition age youth who live in pLTC settings are called “residents” and have substantial functional and or developmental impairments.<sup>4,5</sup> Common conditions and medical diagnoses include congenital anomalies, cystic fibrosis, multisystem disease and oncologic disease. Residents typically require 24-hour skilled nursing procedures and are dependent on technology and coordination of care among numerous provider groups for activities of daily living.<sup>4,5</sup> Intensity of care needs depends on multiple factors, including the physical and developmental age and stage of the resident, type and level of technological and or functional support requirements such as mechanical ventilation, orthotic assistance, feeding with and maintenance of

*Journal for Healthcare Quality*, Vol. 40, No. 6, pp. 384–391

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The authors declare no conflicts of interest.

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**Funders:** This study was part of a larger parent project funded by the Agency for Healthcare Research and Quality (Keep it Clean for Kids (KICK), (R01HS021470). Amanda Hessels is supported by a DHHS/CDC/NIOSH Career Development Award (1K01OH011186-01).

DOI: 10.1097/JHQ.0000000000000134

gastrointestinal devices. Residents in these settings have functional and physiological needs met while also receiving occupational, physical therapy, and academic services through a “school” type setting within the facility.<sup>4,5</sup> Residents use a sizeable amount of resources within the pLTC setting and because of fragile health status, often transition between pLTC and hospital settings to receive care for exacerbations of conditions.<sup>4-7</sup> Thus, although these hybrid residential and acute health care settings are few, estimates include approximately 100 in the United States, they provide care for approximately 29,000 children with complex medical conditions, which is extremely costly and resource intensive.<sup>4,5,7</sup>

Numerous provider types, including, nurses, physical therapists, social workers, teachers, and others, must interact routinely to provide coordinated, safe care for these children.<sup>6,8,9</sup> Understanding features of this environment and team interaction may provide insight into areas of strength and areas of opportunity within these settings, as well as be useful for external benchmarking and fostering a learning health system within this community of provider organizations. We posit dimensions of a PSC, such as leadership and management support, sufficient resources, a nonpunitive work environment are universally influential on provider behavior regardless of the patient population served. Currently, we are unaware of any measures to quantify PSC in pLTC settings; therefore, there is no comparative data to examine differences across pediatric facilities or types of facilities (pediatric or adult). Potential implications of this work include the ability to benchmark internally and externally within pediatric settings and across facility types (adult and pediatric) where these children may transition. Future work will then be needed to identify the factors that are modifiable and associated with safe, high-quality care in pediatric settings.

In recent work, we tested the Agency for Healthcare Research and Quality (AHRQ) Nursing Home of PSC survey slightly modified for use in pLTC and found the instrument to be reliable and valid in this setting using data from a one-time survey administration.<sup>10-12</sup> Now with access to additional data collected from the same sites 2 years later, we aim to expand our understanding of PSC in pLTC.

## **Purpose**

The purposes of this study are to (1) describe PSC in pLTC, (2) assess the relationship of PSC to outcomes

of staff willingness to tell friends the facility is safe and staff perception of overall facility safety rating, and (3) test the stability and reliability of the PSC survey over time. The purpose of this article is to inform health care quality professionals of study findings and implications for practice.

## **Methods**

### **Design**

This survey was conducted as part of a 4-year quasi-experimental study to improve hand hygiene at three pLTC facilities in the New York metropolitan area from 2012 to 2016. This study addresses the following research questions: (1) what is the PSC in pLTC, (2) is there a relationship between PSC to outcomes of staff willingness to tell friends that the facility is safe and staff perception of overall facility safety rating, and (3) does the PSC survey demonstrate stability over time?

### **Sample and Setting**

During the study period, the 3 facilities had 54, 97, and 137 beds and provided a wide range of medical, therapeutic, and educational services. Most residents at these facilities have many chronic comorbidities with 70% having neurologic disorders (e.g., hypoxic ischemic encephalopathy, cerebral palsy, brain anomaly), 50% having respiratory disorders (e.g., chronic lung disease, airway malacia, bronchopulmonary dysplasia), and 32% having gastrointestinal disorders (aphagia, short bowel syndrome, feeding disorder). Residents also frequently use invasive devices with 59% having a feeding tube and 30% having a tracheostomy.<sup>8</sup> All staff were eligible for inclusion in the study including clinical, therapeutic, school, administrative, and housekeeping personnel.

### **Ethical Approvals**

This study was approved by our organization’s Institutional Review Board (AAK0504) as well as by each site’s ethics review committee.

### **Data Collection**

The Nursing Home Survey of Patient Safety Climate in pLTC (NHSPSC-*pLTC*) is an adaptation of the original tool, the Nursing Home Survey of Patient Safety Climate (NHSPSC).<sup>10,11</sup> The tool was slightly modified for the pediatric setting, for example, the term “nursing home” was replaced by “facility.” The NHSPSC-*pLTC* consists of 51 items of which 42 items fall into 12 unique dimensions including

“teamwork,” “staffing,” “compliance with procedures,” “training and skills,” “nonpunitive response to mistakes,” “handoffs,” “feedback and communication about incidents,” “communication openness,” “supervisor expectations and actions promoting resident safety,” “overall perceptions of resident safety,” “management support of resident safety,” and “organizational learning.” The original tool has demonstrated construct and content validity and internal reliability (Cronbach alpha 0.71–0.86 per dimension) in adult nursing home settings.<sup>11,12</sup> These 12 dimensions were previously established by confirmatory factor analysis for the pLTC setting.<sup>11</sup>

Examples of the 42 items included in each dimension follow. Dimensions such as “feedback and communication about incidents” asks respondents to rate the following: (1) “when staff report something that could harm a child someone takes care of it,” (2) “in this facility, we talk about ways to keep incidents from happening again,” (3) “staff tell someone if they see something that might harm a child,” and (4) “in this facility we discuss ways to keep children safe from harm.”<sup>9</sup> The dimension “nonpunitive response” includes the following items: (1) “Staff are blamed when a child is harmed,” (2) “Staff are afraid to report their mistakes,” (3) “Staff are treated fairly when they make mistakes,” and (4) “Staff feel safe reporting their mistakes.”<sup>9</sup> For each question, the possible answers include strongly disagree, disagree, neither agree nor disagree, agree, strongly agree, and does not apply or do not know. Responses were scored from 1 to 5, with 1 as strongly disagree and 5 as strongly agree. Responses “does not apply/do not know” were scored as nine and recoded as missing data per AHRQ Survey Users’ Guide.<sup>9</sup> Dimensions were scored from one to five based on the average score of question responses with reverse coding of negatively worded questions.

Of the remaining nine items, two were treated as outcome items related to the respondents’ overall perception of patient safety and seven were demographic items related to respondent characteristics. The outcome items measured overall ratings of staff perceptions of patient safety: “I would tell friends that this is a safe facility for their children” and “Please give this facility an overall rating on safety for children.” For the first item, it was measured as endorsed if the respondent answered “Yes.” Responding “Maybe” or “No” was measured as not endorsed. The second item was measured as endorsed if the respondent answered “Excellent,” “Very Good,” or “Good.” Responding “Fair”/“Poor” was measured as not endorsed.

## Procedures

Paper surveys were distributed to direct and indirect care providers at each pLTC facility during each of the first 3 years of the parent study. The study researchers distributed the survey during one day shift and one night shift at each facility. The pLTC facilities then duplicated blank surveys as necessary to meet the needs of their staff. However, because we do not know how many people it was distributed to, we cannot calculate a response rate, although as an estimate, there were 1,500 employees across the three facilities. Completed surveys were returned to an envelope in the mailboxes of the infection prevention and control coordinators. Staff were instructed to not write any identifying information on the survey to maintain anonymity. No incentive was provided for survey completion.

## Data Analysis

We examine Year 3 survey data and compared findings to Year 1 data. Descriptive statistics were reported as appropriate to summarize respondent characteristics, staff perceptions of patient safety, and the NHSPSC-pLTC dimensions. Internal consistency of the 12 dimensions was evaluated using Cronbach’s alpha. Logistic regression was used to conduct bivariate and multivariable analyses. Staff position and years worked in the facility were dichotomized. Staff position was divided into nursing staff, including registered nurses and certified nursing assistants, versus all other staff. Years worked in the facility were divided into less than or equal to 2 years and greater than 2 years. For the multivariable analyses, the potential confounders of facility, staff position, and years worked at the facility were included in addition to the 12 dimensions of the NHSPSC-pLTC. The final multivariable model was determined using backward elimination. Facility, staff position, and years worked at the facility were included, independent of statistical significance. Statistical significance was assigned a priori at  $p < .05$ . All data analyses were conducted using SAS 9.3 (SAS Institute, Cary, NC).

## Results

### Demographics

In Year 3, there were a total of 208 surveys completed across the three pLTC facilities. All 51 items were answered for 65% of the surveys (135/208); 54% (113/208) had missing responses for at least 1 item mapped to 1 of the 12 dimensions, 4% (9/208) had

**Table 1. Respondent Characteristics**

Item	<i>n</i> (%) <i>N</i> = 208
Facility	
Site 1	68 (53)
Site 2	94 (45)
Site 3	46 (22)
Position in pediatric long-term care facility	
Administrator/manager	14 (7)
Physician	6 (3)
Licensed nurse	71 (34)
Nursing assistant/aide	32 (15)
Other direct care staff	33 (16)
Administrative support staff	5 (2)
Support staff	0 (0)
Other	1 (0.5)
Missing	46 (22)
Years worked in the facility	
Less than 1 yr	29 (14)
1–2 yrs	41 (20)
3–10 yrs	84 (40)
11 yrs or more	31 (15)
Missing	23 (11)
Works 25 hr or more per week in facility	173 (83)
Missing	18 (9)
Shift worked most frequently	
Days	132 (63)
Evenings	23 (11)
Nights	24 (12)
Missing	29 (14)
Paid by staff agency	12 (6)
Missing	19 (9)
Majority of work directly with children	163 (78)
Missing	14 (7)
Position location	

**Table 1. Respondent Characteristics (Continued)**

Item	<i>n</i> (%) <i>N</i> = 208
Long-term care unit	139 (67)
School	14 (7)
Other	27 (13)
Missing	28 (13)

missing responses for at least 1 outcome item, and 27% (56/208) had missing responses for at least 1 demographic item.

Of the 208 respondents, 50% (103/208) were nursing staff, either licensed nurses ( $n = 71$ ) or certified nursing assistants ( $n = 32$ ). The majority, 58% (115/208) of respondents had worked at their respective facility for at least 3 years and 83% (173/208) worked there at least 25 hours per week. Most respondents worked during the day (63%, 132/208) and were not employed by a staffing agency (85%, 177/208). The majority 78% (163/208) were direct care providers and the majority 67% (139/208) worked within the facility as opposed to in the associated school. Table 1 provides a complete description of the respondent characteristics.

### Findings

To address research question (1), “what is the PSC in pLTC,” the scores for each of the 12 dimensions ranged from 2.69 to 4.26 (possible range 1–5), and the lowest rated dimension was “nonpunitive responses” to mistakes and the highest rated dimension was “feedback and communication about incidents.” The scores and Cronbach’s alpha for each of the domains are reported in Table 2; the Cronbach’s alpha for the entire scale was 0.96. This table also includes the scores and Cronbach’s alpha from the first time the survey was distributed during the previously published factor analysis for comparison. The majority, 79% (164/208) of respondents stated that they would “tell their friends that the facility was safe for their children.” Relatedly, 84% (174/208) rated the facility on safety for children at good, very good, or excellent.

To address research question (2), “is there a relationship between PSC to outcomes of staff willingness to tell friends the facility is safe and staff perception of overall facility safety rating,” we found that each of the 12 dimensions of the NHSPSC-pLTC

**Table 2. NHSPSC-pLTC Dimensions**

Dimension	Average score year 1 (range)	Average score year 3 (range)	Cronbach $\alpha$ year 1	Cronbach $\alpha$ year 3
Feedback and communication about incidents	4.44 (2.25–5)	4.26 (1–5)	0.84	0.83
Overall perceptions of resident safety	4.37 (1.33–5)	4.26 (1–5)	0.84	0.87
Compliance with procedures	3.83 (1.67–5)	3.73 (1.33–5)	0.68	0.63
Supervisor expectations and actions promoting resident safety	4.06 (1–5)	3.77 (1–5)	0.82	0.90
Organizational learning	3.84 (1.5–5)	3.61 (1–5)	0.72	0.80
Handoffs	3.89 (1.5–5)	3.50 (1–5)	0.83	0.90
Management support of resident safety	3.54 (1–5)	3.46 (1–5)	0.83	0.82
Training and skills	3.66 (1–5)	3.44 (1–5)	0.72	0.76
Teamwork	3.60 (1.25–5)	3.41 (1–5)	0.84	0.91
Communication openness	3.17 (1–5)	2.92 (1–5)	0.85	0.86
Staffing	3.23 (1–4.75)	2.77 (1–5)	0.55	0.65
Nonpunitive responses to mistakes	2.97 (1–5)	2.69 (1–5)	0.74	0.79

NHSPSC = nursing home patient safety culture; pLTC = pediatric long-term care.

were significantly associated ( $p < .05$ ) with “staff recommendation” of the facility except “compliance with procedures” ( $p = .50$ ). The three most strongly associated dimensions with “staff recommendation” of the facility were “overall perceptions” of the facility, “organizational learning,” and “feedback and communication about incidents” (Table 3). In the multivariable model, only the dimensions of “communication openness” ( $p < .001$ ) and “overall perceptions of resident safety” ( $p < .001$ ) remained significant.

All 12 dimensions were significantly associated with staff “overall safety rating.” “Overall safety rating” was most strongly associated with “overall perceptions of resident safety” followed by “organizational learning” and “training and skills.” The dimension that was least associated with “overall safety rating” was “compliance with procedures” (Table 3). A multivariable model could not be conducted due to the distribution of missing responses. Finally, to address research question (3), “does the PSC survey demonstrate stability over time,” we found that all scores were similar but lower in Year 3, with the largest change in the “staffing” dimension (0.46 point lower) (Table 2).

## Limitations

This study had several limitations. First, missing data and nonresponse bias may be present and those with strong negative or positive feelings may have been more likely to respond. In addition, because of the staff recruitment method, we are unable to determine the response rate per site, or how comparable the staff was between Years 1 and 3.

## Discussion

In this study, we identified several important findings. Regarding the tool, the subscales among pediatric staff performed similarly to documented reliability in adult nursing home settings, suggesting that the tool may be more broadly applicable to other pLTC settings to monitor the important phenomena of PSC within their organizations over time. For the first time, this has been demonstrated in pLTC, indicating the value of this tool to guide internal improvements and external benchmarking may be similar to the adult nursing home and hospital AHRQ surveys.<sup>1,9</sup> We also found that

**Table 3. NHSPSC-pLTC Dimensions and Staff Recommendation of Facility and Overall Safety Rating**

Dimension	Recommendation of facility		Overall safety rating	
	OR (95 CI)	p-value	OR (95 CI)	p-value
Teamwork	3.32 (2.17–5.07)	<.01	2.94 (1.88–4.61)	<.01
Staffing	5.55 (2.83–10.89)	<.01	4.68 (2.25–9.72)	<.01
Compliance with procedures	1.20 (0.71–2.02)	.50	1.87 (1.05–3.36)	.03
Training and skills	5.22 (2.85–9.57)	<.01	8.31 (3.75–18.44)	<.01
Nonpunitive responses to mistakes	4.57 (2.56–8.17)	<.01	4.73 (2.47–9.08)	<.01
Handoffs	3.57 (2.07–6.16)	<.01	3.02 (1.75–5.21)	<.01
Feedback and communication about incidents	7.64 (3.82–15.28)	<.01	8.14 (3.84–17.26)	<.01
Communication openness	5.30 (3.06–9.20)	<.01	4.50 (2.57–7.87)	<.01
Supervisor expectations and actions promoting resident safety	4.34 (2.68–7.05)	<.01	4.52 (2.72–7.49)	<.01
Overall perceptions of resident safety	73.02 (13.18–404.41)	<.01	18.41 (6.05–56.09)	<.01
Management support of resident safety	6.33 (3.34–12.01)	<.01	5.34 (2.85–10.00)	<.01
Organizational learning	12.88 (5.43–30.57)	<.01	15.12 (5.57–41.10)	<.01

CI = Confidence interval; NHSPSC = nursing home patient safety culture; OR = odds ratio; pLTC = pediatric long-term care.

perceptions of PSC remained consistent between Year 1 and Year 3, indicating that they are relatively stable over time in these settings and suggesting that efforts to change/improve the safety culture could be assessed using this tool at regular time intervals. Respondents were most positive about “feedback and communication about incidents” and “overall perceptions of safety” and least positive about “staffing” and “nonpunitive response to mistakes.” While it seems contradictory that perceptions were most positive about “feedback and communication about incidents” and least positive about “nonpunitive responses,” these dimensions are quite different.

“Feedback and communication about incidents” suggests that staff have confidence that leadership acts to prevent mistakes after staff report incidents, and staff and leaders discuss openly and freely report issues and ongoing discussions occur to increase safety awareness. The dimension “nonpunitive response to mistakes” characterizes perceptions of a just culture, crises management, and effect of leadership on staff perceptions of safety to report. Thus, while staff perceive that they can and do

communicate about incidents, they do not feel psychologically safe doing so.<sup>13</sup> This is important as psychological safety is an important component of effective team functioning and performance, a hallmark of a highly reliable organization.<sup>13,14</sup>

We also found a positive perception of PSC was significantly associated with “overall ratings,” indicating providers at sites with a better perception of safety would recommend and tell friends the facility was safe for children and would give the facility a high overall rating for safety for children. Specifically, staff with a favorable “overall perception of the facility,” “organizational learning,” “feedback and communication about incidents,” and “training and skills” development opportunities are more likely to “recommend the facility” and give a “high rating” than those that do not favorably perceive these features.

For administrators, these findings suggest that deficits in these PSC domains are most important to address. Administrators and managers may wish to consider areas of opportunity and targeted improvements to ensure the organization learns from its mistakes, and there is sufficient opportunity for team member training and learning. For employees,

health care workers and human resources, these findings reaffirm to current employees and suggest to those seeking employment, that organizations that are highly recommended for patients and highly rated for child safety also meet the needs of employees and health care workers, such as offering sufficient training and skills development. Finally, these findings suggest to consumers that facilities with high overall safety ratings are likely to also have features of a positive PSC, such as transparency, responsiveness, and teamwork, these are features of highly reliable organizations associated with better patient outcomes.<sup>8,14</sup>

## Conclusions

The modified NHSPSC-pLTC survey was reliable by Cronbach alpha, findings were consistent over time, staff perceptions on “feedback and communication about incidents” and “overall perceptions of resident safety” were most positive, and positive perceptions of PSC by staff were associated with “recommending the facility” and high “overall ratings for child safety.” These study findings provide health care quality professionals with additional evidence and tools to assess and improve patient safety in pediatric settings.

## Implications

These study findings have practice, policy, and research implications for health care quality professionals. This tool may be a useful adjunct to improve quality and safety initiatives in pLTC; use of a reliable and valid tool will allow quality professionals to gain insight into areas of strength and opportunity within the specialized setting. Use of this tool may also allow quality professionals to assess differences between provider categories and disciplines and target interventions based on opportunities identified. Knowledge derived also has implications for consumers, caregivers, employees, and administrators. By example, findings can be used generate evidence for policies that support the most efficient and targeted interventions to improve the delivery of safe care. Unfortunately, the relationship of PSC to patient outcomes in pLTC remains unknown because these data are not routinely collected. Use of this tool is a step toward closing that gap and can provide data for research to examine whether these findings are more broadly generalizable, by example across diverse geographic locations. Future research that

closes this gap is warranted to support safe and high-quality care for the vulnerable pLTC population.

## Acknowledgments

The authors gratefully acknowledge all study site participants and administrators for their dedication and support of this project. This study was part of a larger parent project funded by the Agency for Healthcare Research and Quality (Keep it Clean for Kids (KICK), R01HS021470). Amanda Hessels is supported by a DHHS/CDC/NIOSH Career Development Award (1K01OH011186-01).

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## References

1. Sorra JS, Nieva VF. *Hospital Survey on Patient Safety Culture*. AHRQ Publication No. 04-0041, September, 2004. Agency for Healthcare Research and Quality. Rockville, MD. 2004. <http://www.ahrq.gov/qual/patientsafetyculture/>. Accessed November 27, 2017.
2. Dicuccio MH. The relationship between patient safety culture and patient outcomes: A systematic review. *J Patient Saf*. 2015;11:135-142.
3. Mardon RE, Khanna K, Sorra J, Dyer N, Famolaro T. Exploring relationships between hospital patient safety culture and adverse events. *J Patient Saf*. 2010;6:226-232.
4. Friedman SL, Kalichman MA. Out-of-home placement for children and adolescents with disabilities. *Pediatrics*. 2014; 134(4):836-846.

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5. Cohen E, Kuo DZ, Agrawal R, et al. Children with medical Complexity: An emerging population for clinical and research initiatives. *Pediatrics*. 2011;127(3):529-538.
  6. Larson EL, Cohen B, Murray M, Saiman L. Challenges in conducting research in pediatric long-term care facilities. *Clin Pediatr*. 2014;53(11):1041-1046.
  7. Caicedo C. Health and functioning of families of children with special health care needs cared for in home care, long-term care, and medical day care settings. *J Dev Behav Pediatr*. 2015;36(5):352-361.
  8. Navarra AM, Schlau R, Murray M, et al. Assessing nursing care needs of children with complex medical conditions: The nursing-kids intensity of care survey (N-KICS). *J Pediatr Nurs*. 2016;31(3):299-310.
  9. Saiman L, Maykowski P, Murray M, et al. Incidence, risks, and types of infections in pediatric long-term care facilities. *JAMA Pediatr*. 2017;171(9):872-878.
  10. Sorra J, Gray L, Famolaro T, et al. *Nursing Home Survey on Patient Safety Culture*. (Prepared by Westat, Under Contract No. HHSA290201300003C). AHRQ Publication No. 15(16)-0052-EF (Replaces 08(09)-0060). Rockville, MD: Agency for Healthcare Research and Quality; 2016.
  11. Hessels AJ, Murray M, Cohen B, Larson EL. Patient safety climate survey in pediatric complex care settings: A factor analysis. *J Patient Saf*. 2017 Apr 19 [Epub ahead of print]. PMID: PMC5648643.
  12. Hessels AJ, Agarwal M, Saiman L, Larson EL. Measuring patient safety culture in pediatric long-term care. *J Pediatr Rehabil Med*. 2017;10(2):81-87.
  13. Manswer T. Teamwork and patient safety in dynamic domains of healthcare: A review of the literature. *Acta Anaesthesiol Scand*. 2009;53:143-151.
  14. Baker DP, Day R, Salas E. Teamwork as an essential component of high-reliability organizations. *Health Serv Res*. 2006;41(4, pt 2):1576-1598.