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**Original Research Article**

# An observational study of monitoring vital signs in children admitted to Ward 2 at Ola During Children's Hospital, Freetown: an insight into the quality of nursing care

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## ABSTRACT

**Background:** Reliable paediatric vital-signs monitoring enables early detection of deterioration, yet adherence varies in low-resource settings. To quantify ODCH nurses' monitoring practices, protocol adherence and equipment/workflow barriers; and to examine factors associated with compliance.
**Methods:** Descriptive cross-sectional survey of nurses at Ola During Children's Hospital, Freetown (25–30 August 2025). Consecutive sampling enrolled N=50 eligible nurses. A structured questionnaire captured practice, awareness/training, equipment and perceptions. Outcomes were protocol compliance (Always/Often) and a Vital-Signs (VS) Monitoring Index (0–1). Analyses used $\chi^2$ with Cramér's V, t-tests and Spearman's ρ ($\alpha$=0.05).
**Results:** Consistent monitoring was highest for temperature 98%, pulse 88%, respiratory rate 86%, $SpO_2$ 78%, but lower for blood pressure 42% and pain score 10%. Protocol compliance=58% (Always 48%, Often 10%), documentation "Always" =72%. VS Index: mean 0.67, SD 0.22. Guideline awareness strongly predicted compliance ($\chi^2$ (1) =15.25, p=0.0001, V=0.552); recent training showed a medium association ($\chi^2$ (1) =6.91, p=0.0086, V=0.372). Frequently reported barriers included lack of equipment 76%, high patient load 68% and inadequate staffing 68%; facilitators were functional equipment 73.5%, training 72%, adequate staffing 68% and clear protocols 52%. Several comparisons were non-significant, likely reflecting limited power (n=50).
**Conclusions:** Core observations are performed consistently at ODCH, but blood pressure and pain assessment are major gaps. Strengthening guideline uptake via brief, repeated training; ensuring child-appropriate BP cuffs and validated pain scales; embedding WHO-aligned frequency job aids/PEWS, and improving equipment readiness are feasible, high-yield steps to enhance monitoring reliability and patient safety.

**Keywords:** Equipment readiness, Low-resource settings, Monitoring compliance, Nursing practice, PEWS, Paediatrics, Sierra leone, Vital signs

## INTRODUCTION

Monitoring vital signs is a cornerstone of paediatric nursing because children especially infants and younger patients often cannot articulate evolving symptoms. Core parameters (temperature, heart rate, respiratory rate, blood pressure and oxygen saturation) offer early signals of physiological deterioration and guide timely escalation and their accurate, regular measurement and documentation are linked to safer care and improved recognition of illness trajectories.[1-3] International and professional guidance therefore frames vital-signs monitoring as both a clinical and patient-safety function, calling for standardized practice, reliable equipment and supervised documentation as part of routine care.[1,2,4] Despite this consensus, several studies particularly from low-resource settings consistently report variation in the frequency, completeness and documentation of vital signs.[5-7]

Reported gaps are attributed to systemic constraints including high workloads, suboptimal staffing, equipment shortages, limited training and inconsistent use of protocols.[5-7] Where early-warning tools are absent or weakly embedded, clinical deterioration can be missed or detected late.[8,9] Even in better-resourced contexts, adherence is influenced by shift patterns and ward culture: completion of observations tends to be lower on night shifts and role seniority does not always translate to higher compliance, underscoring the need for system-level supports rather than reliance on individual vigilance.[10,11] Technologies such as wireless or automated monitoring can detect deterioration earlier than intermittent manual observations, but their benefits depend on reliable devices, alarm management and adequate staff training and may introduce new challenges (e.g., false alarms) if implementation is not carefully managed.[4,12]

Within Sierra Leone's tertiary paediatric context specifically Ola During Children's Hospital (ODCH) these global challenges are plausible and potentially magnified by workforce and equipment pressures. In such environments, inconsistent observation frequency, incomplete vital-sign sets and documentation gaps can blunt the effectiveness of escalation protocols and delay recognition of deterioration.[1,2] Early-warning approaches such as Paediatric Early Warning Scores provide a structured pathway to identify at-risk patients and prompt timely response, but their impact hinges on consistent, accurate bedside measurements and routine use by nursing staff.[8,9] Yet, despite the centrality of nursing observation to paediatric safety, few studies have described ODCH-specific patterns of vital-sign monitoring practice, leaving important gaps in local evidence.[5-7,10] Key uncertainties include whether nurses monitor core vital signs (and pain) at guideline-aligned frequencies; the completeness and documentation quality of observation sets, how knowledge, perceptions and attitudes shape practice and which modifiable system factors (staffing levels, workload, equipment availability and training) most constrain or enable consistent monitoring.[5-7,10] Generating local data can inform targeted in-service training, strengthen monitoring protocols and escalation pathways and guide investment in essential equipment to better align ward practice with international expectations for safe paediatric care.[1-3]

The objective of this study was to appraise paediatric-unit nursing practice at ODCH by quantifying the frequency and consistency of core vital-sign and pain assessments, assessing adherence to guideline-aligned protocols and documentation standards, exploring nurses' knowledge, perceptions and attitudes toward monitoring; and identifying system and context factors associated with practice quality, to inform actionable strategies for strengthening monitoring reliability and improving paediatric patient safety.[1,2,8,9]

## METHODS

### *Study design and setting*

This descriptive cross-sectional survey assessed paediatric vital-signs monitoring practices, awareness of relevant protocols and guidelines, perceived barriers and facilitators, equipment issues and perceived quality among nurses working in paediatric-related units. The study was conducted at Ola During Children's Hospital (ODCH), Freetown, Sierra Leone, a tertiary-level paediatric facility comprising resuscitation and general ward areas. Data collection took place over a five-day period from 25 August to 30 August 2025.

### *Study population and sampling*

The source population comprised qualified nurses providing care to children within ODCH paediatric units during the study window. All nursing cadres represented in routine staffing Nursing Officers, Registered Nurses and SECHNs were eligible. A consecutive (census) sampling approach was employed: all eligible nurses on duty during the data-collection period were approached and invited to participate. In total, 50 nurses were enrolled and completed the survey (N=50). Although a census approach was used operationally, Yamane's finite-population formula ($n=N/(1+N\cdot e^2)$) provided a priori justification of adequacy for a probability-based design. With an accessible population of N=50 and a conventional margin of error e=0.05, the minimum required sample was $n=50/(1+50\cdot 0.05^2)=50 / 1.125\approx 44.5$, rounded to 45. Allowing 10% for potential non-response ($45/0.90\approx 50$) yielded a target of approximately 50, consistent with the achieved sample.

### *Inclusion criteria*

Inclusion criteria were qualified nurses of any cadre currently posted to ODCH paediatric units during the data-collection window, with a minimum of six months'

cumulative paediatric nursing experience at ODCH to ensure familiarity with local monitoring routines and policies and who provided written informed consent.

### *Exclusion criteria*

Exclusion criteria were student nurses, interns or purely administrative staff; nurses on leave or off-duty for the entirety of the study window; and individuals who declined consent or returned substantially incomplete questionnaires.

### *Data source and instrument*

Data were obtained via a structured, self-administered questionnaire developed from paediatric vital-signs monitoring guidance and local standard operating procedures.

The instrument captured sociodemographic and professional characteristics (age group, sex, current role/cadre, paediatric experience category, hospital type, unit); awareness, training and knowledge (awareness of hospital guidelines and specific protocols, training received, familiarity with PEWS, self-rated understanding and a knowledge check distinguishing standard from non-standard paediatric vital signs), reported practice (protocol-guided monitoring frequencies for critically ill, febrile and stable children, routine monitoring frequency for stable patients per shift, documentation practices and frequency of using protocols), consistency by vital sign (Yes/No indicators for temperature, pulse, respiratory rate, blood pressure, oxygen saturation and pain score), barriers and facilitators (workload, staffing, equipment, training, clarity of protocols, time and facilitators such as training, clear protocols, staffing, equipment, supervision) and equipment and perceived quality (equipment availability, malfunctions, confidence using equipment, overall quality of vital-signs assessments, inaccurate recordings, perceived staffing support and feeling rushed). Responses used fixed categories aligned to a pre-specified coding scheme (e.g., Yes/No, ordered frequency scales, Likert-type options).

### *Data collection procedures*

Following ethical and administrative approvals, the research team coordinated recruitment with nurse managers across shifts. During 25–30 August 2025, eligible on-duty nurses were approached, the study purpose was explained and written informed consent was obtained.

Participants completed the paper-based questionnaire individually (approximately 10–15 minutes) and returned it in sealed envelopes to preserve confidentiality. No direct observation of care and no patient-chart review were undertaken. Completed questionnaires were checked for completeness at the point of return; where feasible, minor missing responses were clarified immediately with the participant.

### *Data management*

Questionnaires were coded according to a predefined variable codebook. Data were entered into a spreadsheet and exported to SPSS (Version 25) for analysis. Standard data-cleaning procedures included range checks, cross-item consistency checks and recoding of special missing codes to system-missing values. Derived variables were generated prior to analysis. "Protocol compliance (good)" was dichotomized as "Always" or "Often" versus all other responses. A VS Monitoring Index was computed for each participant by averaging the six binary indicators (temperature, pulse, respiratory rate, blood pressure, $SpO_2$, pain, coded 1=Yes, 0=No) to yield a 0–1 proportion, with higher scores indicating more consistent monitoring across all vital signs.

### *Statistical analysis*

All analyses were performed in SPSS Version 25 with a two-sided $\alpha$ of 0.05 defining statistical significance. Descriptive statistics summarized categorical variables as frequencies and percentages and continuous or derived indices (e.g., the VS Monitoring Index) as means and standard deviations. Bivariate associations between categorical predictors such as guideline awareness, receipt of training, sex, unit, age category, equipment availability and perceived staff shortages and protocol compliance (good vs. not) were examined using Pearson's chi-square tests, with Cramér's V reported as the effect size for significant results. Independent-samples t-tests compared the VS Monitoring Index across two-level groups (e.g., training received: Yes vs. No; paediatrics unit vs. other), with Cohen's d reported for significant differences. Spearman's rank correlation ($\rho$) was used to explore monotonic associations between ordered variables (e.g., equipment availability and perceived overall quality). Significant associations are reported with test statistics ($\chi^2$, t or $\rho$), p-values, effect sizes (Cramér's V or Cohen's d) and sample size (N), matching the analytic specifications used in the Results chapter.

### *Ethical considerations*

The study adhered to the ethical principles of the Declaration of Helsinki. Ethical approval was granted by the ODCH Research Ethics Committee (Ref: go ahead 338) and administrative permission was obtained from hospital management to recruit nurses during working hours.

All participants provided written informed consent after receiving a clear explanation of the study's purpose, procedures, risks and benefits. Participation was voluntary, with the option to refuse or withdraw at any time without consequence. No patient-level data were

collected. Anonymity was ensured through unique study identifiers without names and completed questionnaires were stored securely with access restricted to the research team.

## RESULTS

### *Socio-demographic characteristics*

A total of 50 nurses participated in the study. Data were collected using a structured, researcher-administered questionnaire with complete responses for the variables presented. The largest age group was 20–30 (42.0%). The study demonstrated a female predominance (76.0%). By role, most respondents were registered nurse (62.0%). The most common experience band was 1–3 (40.0%). The predominant hospital type was teaching (86.0%). Most respondents worked in paediatrics (94.0%).

### *Awareness, training and knowledge of protocols*

Overall, 72.0% reported being aware of hospital guidelines for vital-signs monitoring and 72.0% had received formal training in paediatric vital-signs monitoring. Familiarity with PEWS was lower (32.0%). Self-rated understanding of guidelines was most commonly Good (46.0%). On the knowledge check ("Which is NOT a standard paediatric vital sign?"), 26.0% correctly identified blood glucose as non-standard.

### *Practice of vital-signs monitoring*

*Protocol-guided monitoring*

Only 7.2% reported following protocols always/often across cases, while 72.0% reported they always document vital signs after taking them.

*Consistency by vital sign*

The proportion reporting consistent monitoring (Yes) was temperature 98.0%, pulse 88.0%, respiratory rate 86.0%, oxygen saturation 78.0%, blood pressure 42.0% and pain score 10.0%.

*Composite index*

The vital signs monitoring index (proportion of the six vital signs marked "Yes" for consistent monitoring) had N=50, mean=0.67, SD=0.22, range=0.17–1.00.

### *Barriers and facilitators*

Frequently reported barriers were lack of equipment (76.0%), high patient load (68.0%), inadequate staffing (68.0%), lack of training (54.0%), time constraints (48.0%) and unclear protocols (44.0%). Commonly endorsed facilitators were functional equipment (73.5%), training (72.0%), adequate staffing (68.0%), clear protocols (52.0%) and supervision (50.0%).

### *Equipment and perceived quality*

Equipment availability was most often rated "Often" (46.0%). Equipment malfunctions were reported frequently (50.0%) or occasionally (48.0%), with 2.0% reporting never.

Confidence in using monitoring equipment was most commonly yes (52.0%). The overall quality of vital-sign assessments was most frequently rated Fair (38.0%). Reports of inaccurate recordings (e.g., guessed values) were Occasionally (56.0%), Frequently (34.0%), Rarely (4.0%) and Never (6.0%).

### *Relationship between selected factors and practice or quality*

Bivariate tests examined associations between professional or contextual factors and practice or quality outcomes.

Statistically significant findings (two-sided, $\alpha=0.05$) are reported with effect sizes. guideline awareness and protocol compliance (always/Often): $\chi^2$ (1) =15.25, p=0.0001, Cramer's V=0.552 (large), N=50. Training received and Protocol compliance (Always/Often): $\chi^2$ (1) =6.91, p=0.0086, V=0.372 (medium), N=50. Sex and Protocol compliance (Always/Often): $\chi^2$ (1) =7.06, p=0.0079, V=0.376 (medium), N=50.Training in the last 2 years and Confidence using equipment: $\chi^2$ (2) =10.87, p=0.0044, V=0.466 (medium–large), N=50.

The following were not statistically significant in this study, unit and protocol compliance, age group and protocol compliance, equipment availability and protocol compliance, staff-shortages impact and protocol compliance, training received (Yes/No) and VS index (t-test), paediatrics unit vs Other×VS index (t-test) and equipment availability. Overall quality (Spearman ρ) (all p>0.05).

**Table 1: Socio-demographic characteristics.**

| Distribution | Frequency | % |
|---|---|---|
| **Age (in years)** | | |
| 20–30 | 21 | 42.0 |
| 31–40 | 19 | 38.0 |
| 41–50 | 9 | 18.0 |
| Above 50 | 1 | 2.0 |

Continued.

| Distribution | Frequency | % |
|---|---|---|
| Total | 50 | 100.0 |
| **Sex** | | |
| Male | 12 | 24.0 |
| Female | 38 | 76.0 |
| Total | 50 | 100.0 |
| **Role** | | |
| Nursing officer | 2 | 4.0 |
| Registered nurse | 31 | 62.0 |
| SECHN | 16 | 32.0 |
| Other | 1 | 2.0 |
| Total | 50 | 100.0 |
| **Years of experience** | | |
| <1 year | 6 | 12.0 |
| 1–3 | 20 | 40.0 |
| 4–6 | 12 | 24.0 |
| >6 | 12 | 24.0 |
| Total | 50 | 100.0 |
| **Hospital type** | | |
| Public | 7 | 14.0 |
| Teaching | 43 | 86.0 |
| Total | 50 | 100.0 |
| **Unit** | | |
| ICU | 2 | 4.0 |
| Emergency department | 1 | 2.0 |
| Paediatrics | 47 | 94.0 |
| Total | 50 | 100.0 |

**Table 2: Awareness, training and knowledge.**

| Characteristic | Frequency | % |
|---|---|---|
| **Aware of hospital guidelines** | | |
| Yes | 36 | 72.0 |
| No | 14 | 28.0 |
| Total | 50 | 100.0 |
| **Aware of specific guidelines/protocols** | | |
| Yes | 33 | 66.0 |
| No | 17 | 34.0 |
| Total | 50 | 100.0 |
| **Received training on paediatric vital signs monitoring** | | |
| Yes | 36 | 72.0 |
| No | 14 | 28.0 |
| Total | 50 | 100.0 |
| **Familiar with PEWS** | | |
| Yes | 16 | 32.0 |
| No | 34 | 68.0 |
| Total | 50 | 100.0 |
| **Understanding of guidelines** | | |
| Excellent | 13 | 26.0 |
| Good | 23 | 46.0 |
| Fair | 6 | 12.0 |
| Poor | 8 | 16.0 |
| Total | 50 | 100.0 |
| **Which is NOT a standard paediatric vital sign** | | |
| Temperature | 1 | 2.0 |

Continued.

| Characteristic | Frequency | % |
|---|---|---|
| Blood pressure | 34 | 68.0 |
| Oxygen saturation | 2 | 4.0 |
| Blood glucose | 13 | 26.0 |
| Total | 50 | 100.0 |

**Table 3: Protocol-guided practice.**

| Characteristic | Frequency | % |
|---|---|---|
| **Protocol frequency: critically ill** | | |
| Every 1 hour | 39 | 78.0 |
| Every 4 hours | 8 | 16.0 |
| As needed | 3 | 6.0 |
| Total | 50 | 100.0 |
| **Protocol frequency: febrile children** | | |
| Every 1 hour | 21 | 42.0 |
| Every 4 hours | 15 | 30.0 |
| Every 6 hours | 2 | 4.0 |
| Every shift | 1 | 2.0 |
| As needed | 4 | 8.0 |
| Don't know | 7 | 14.0 |
| Total | 50 | 100.0 |
| **Protocol frequency: stable patients** | | |
| Every 4 hours | 40 | 80.0 |
| Every 6 hours | 4 | 8.0 |
| Every shift | 4 | 8.0 |
| Don't know | 2 | 4.0 |
| Total | 50 | 100.0 |
| **Monitoring frequency for stable patients per shift** | | |
| Every hour | 1 | 2.0 |
| Every 4 hours | 47 | 95.9 |
| Once per shift | 1 | 2.0 |
| Total | 49 | 100.0 |
| **Documentation after taking vital signs** | | |
| Always | 36 | 72.0 |
| Most of the time | 10 | 20.0 |
| Sometimes | 4 | 8.0 |
| Total | 50 | 100.0 |
| **Protocols followed consistently** | | |
| Always | 24 | 48.0 |
| Often | 5 | 10.0 |
| Sometimes | 7 | 14.0 |
| Rarely | 10 | 20.0 |
| Never | 4 | 8.0 |
| Total | 50 | 100.0 |

**Table 4: Consistent monitoring of vital signs.**

| Vital sign | Frequency | % |
|---|---|---|
| **Temperature** | | |
| **No** | 1 | 2.0 |
| **Yes** | 49 | 98.0 |
| **Total** | 50 | 100.0 |
| **Pulse** | | |
| **No** | 6 | 12.0 |
| **Yes** | 44 | 88.0 |

Continued.

| Vital sign | Frequency | % |
|---|---|---|
| **Total** | 50 | 100.0 |
| **Respiratory rate** | | |
| **No** | 7 | 14.0 |
| **Yes** | 43 | 86.0 |
| **Total** | 50 | 100.0 |
| **Blood pressure** | | |
| No | 29 | 58.0 |
| Yes | 21 | 42.0 |
| Total | 50 | 100.0 |
| **Oxygen saturation** | | |
| No | 11 | 22.0 |
| Yes | 39 | 78.0 |
| Total | 50 | 100.0 |
| **Pain score** | | |
| No | 45 | 90.0 |
| Yes | 5 | 10.0 |
| Total | 50 | 100.0 |

**Table 5: Barriers and facilitators.**

| Item | Frequency | % |
|---|---|---|
| **Barrier: High patient load** | | |
| No | 16 | 32.0 |
| Yes | 34 | 68.0 |
| Total | 50 | 100.0 |
| **Barrier: Inadequate staffing** | | |
| No | 16 | 32.0 |
| Yes | 34 | 68.0 |
| Total | 50 | 100.0 |
| **Barrier: Lack of equipment** | | |
| No | 12 | 24.0 |
| Yes | 38 | 76.0 |
| Total | 50 | 100.0 |
| **Barrier: Lack of training** | | |
| No | 23 | 46.0 |
| Yes | 27 | 54.0 |
| Total | 50 | 100.0 |
| **Barrier: Unclear protocols** | | |
| No | 28 | 56.0 |
| Yes | 22 | 44.0 |
| Total | 50 | 100.0 |
| **Barrier: Time constraints** | | |
| No | 26 | 52.0 |
| Yes | 24 | 48.0 |
| Total | 50 | 100.0 |
| **Facilitator: Training** | | |
| No | 14 | 28.0 |
| Yes | 36 | 72.0 |
| Total | 50 | 100.0 |
| **Facilitator: Clear protocols** | | |
| No | 24 | 48.0 |
| Yes | 26 | 52.0 |
| Total | 50 | 100.0 |
| **Facilitator: Adequate staffing** | | |

Continued.

| Item | Frequency | % |
|---|---|---|
| No | 16 | 32.0 |
| Yes | 34 | 68.0 |
| Total | 50 | 100.0 |
| **Facilitator: Functional equipment** | | |
| No | 13 | 26.5 |
| Yes | 36 | 73.5 |
| Total | 49 | 100.0 |
| **Facilitator: Supervision** | | |
| No | 25 | 50.0 |
| Yes | 25 | 50.0 |
| Total | 50 | 100.0 |

**Table 6: Equipment and perceived quality.**

| Item | Frequency | % |
|---|---|---|
| **Equipment availability** | | |
| Always | 11 | 22.0 |
| Often | 23 | 46.0 |
| Sometimes | 16 | 32.0 |
| Total | 50 | 100.0 |
| **Equipment malfunctions encountered** | | |
| Frequently | 25 | 50.0 |
| Occasionally | 24 | 48.0 |
| Never | 1 | 2.0 |
| Total | 50 | 100.0 |
| **Confidence in using monitoring equipment** | | |
| Yes | 26 | 52.0 |
| Partially | 21 | 42.0 |
| No | 3 | 6.0 |
| Total | 50 | 100.0 |
| **Overall quality of vital sign assessments** | | |
| Excellent | 14 | 28.0 |
| Good | 17 | 34.0 |
| Fair | 19 | 38.0 |
| Total | 50 | 100.0 |
| **Observed inaccurate recordings (guessing values)** | | |
| Frequently | 17 | 34.0 |
| Occasionally | 28 | 56.0 |
| Rarely | 2 | 4.0 |
| Never | 3 | 6.0 |
| Total | 50 | 100.0 |
| **Staff shortages negatively impact assessments** | | |
| Yes | 35 | 70.0 |
| No | 4 | 8.0 |
| Occasionally | 11 | 22.0 |
| Total | 50 | 100.0 |
| **Staffing level supports timely assessments** | | |
| Strongly agree | 18 | 36.0 |
| Agree | 24 | 48.0 |
| Neutral | 6 | 12.0 |
| Disagree | 2 | 4.0 |
| Total | 50 | 100.0 |
| **Feel rushed during assessments** | | |
| Always | 6 | 12.2 |

Continued.

| Item | Frequency | % |
|---|---|---|
| Often | 10 | 20.4 |
| Sometimes | 29 | 59.2 |
| Rarely | 1 | 2.0 |
| Never | 3 | 6.1 |
| Total | 49 | 100.0 |

**Table 7: Associations with protocol compliance and VS index.**

| Comparison | Test | Statistic | Df | p-value | Effect size | N |
|---|---|---|---|---|---|---|
| **Guideline awareness and protocol compliance** | Chi-square | 15.25 | 1 | 0.0001 | 0.552 | 50 |
| **Training received and protocol compliance** | Chi-square | 6.91 | 1 | 0.0086 | 0.372 | 50 |
| **Sex and protocol compliance** | Chi-square | 7.06 | 1 | 0.0079 | 0.376 | 50 |
| **Unit and protocol compliance** | Chi-square | 2.31 | 2 | 0.3149 | 0.215 | 50 |
| **Age group and protocol compliance** | Chi-square | 1.23 | 3 | 0.7452 | 0.157 | 50 |
| **Equipment availability and protocol compliance** | Chi-square | 3.73 | 2 | 0.1549 | 0.273 | 50 |
| **Staff shortages impact and protocol compliance** | Chi-square | 5.15 | 2 | 0.076 | 0.321 | 50 |
| **Training received (Yes/No) and vs index** | t-test | 0.35 | | 0.7281 | 0.093 | 50 |
| **Paediatrics unit vs Other and vs index** | t-test | -0.26 | | 0.8208 | -0.277 | 50 |

## DISCUSSION

This cross-sectional survey of 50 ODCH nurses showed high completion of temperature (98%), pulse (88%), respiratory rate (86%) and $SpO_2$ (78%), with markedly lower completion of blood pressure (42%) and especially pain scoring (10%).[13] These patterns suggest that "core" observations that are quick to obtain tend to be prioritized, while parameters that require specific devices (e.g., paediatric BP cuffs) or structured tools (e.g., pain scales) are more likely to be missed.[13] Vital-sign omissions particularly for BP and oxygen saturation have also been reported in other paediatric settings, where incomplete sets were linked to workflow pressure and competing clinical demands.[14]

The relatively strong performance on temperature, pulse and respiratory rate at ODCH is clinically encouraging because these are central to early detection of deterioration in hospitalized children.[13] However, the low blood pressure completion is a meaningful safety gap, because hypotension may be a late sign in paediatric shock and missing BP can delay recognition of severe illness and escalation.[13] Similar constraints have been described in low-resource hospital environments, where monitoring is often intermittent and shaped by staffing limitations, ward layout and variable access to functioning equipment.[15]

Documentation behaviour in the present study (with most nurses reporting they "always" document after measurement) aligns with the idea that staff value documentation, but system conditions can still limit completeness of what gets recorded.[16] Evidence from implementation work in African hospital settings shows that even when staff accept documentation tools, practical issues such as chart availability, workload and alternative places to record observations can undermine standardized recording and completeness.[16] This supports the interpretation that improving monitoring at ODCH will likely require reinforcing systems (tools, workflow, supplies, supervision) in addition to individual-level knowledge.

Pain scoring was the weakest parameter in the ODCH findings (10%), indicating that routine pain assessment is not yet embedded as a standard component of paediatric observations.[13] In Ghana, nurses described barriers to optimal paediatric pain assessment and management including insufficient training, lack of assessment tools, heavy workload and communication difficulties with children who cannot easily self-report pain.[17] This aligns with the ODCH pattern and suggests that pain assessment may improve most when hospitals institutionalize validated pain tools, provide targeted training and normalize pain scoring as part of routine vital-sign rounds.[18]

Low familiarity with PEWS in the ODCH sample (32%) is also consistent with the broader implementation literature, where early warning systems may exist on paper but remain incompletely integrated into daily ward routines.[19] Studies implementing PEWS tools in resource-limited settings report that feasibility improves when staff receive practical training, documentation is standardized and feedback or audit cycles are used to sustain uptake.[19] In higher-resourced tertiary contexts, adherence to Bedside PEWS documentation frequency has still been reported as suboptimal, demonstrating that the challenge is not only awareness but also reliable execution within real-world workflows.[20] Multicentre work from resource-limited hospitals shows that PEWS implementation barriers often include staffing constraints, limited equipment and inconsistent training, while enablers

include leadership support, local adaptation and structured capacity building.[21] Taken together, these comparisons suggest that ODCH may gain the most by pairing PEWS introduction (or strengthening) with simple frequency schedules, routine reinforcement and supportive supervision structures.[13,19,21]

The observed associations in the Results (e.g., guideline awareness and training correlating with better compliance) are therefore plausibly explained by implementation science evidence showing that education and repeated reinforcement improve consistency of monitoring practices.[19,21] Given the documented BP and pain gaps, ODCH-specific improvement actions should prioritize ensuring access to paediatric BP cuffs and functional devices, embedding pain tools into routine charts and strengthening practical competency through short, repeated trainings supported by supervision and feedback.[13,18,19]

### *Limitations*

This was a single-centre, cross-sectional survey with a modest sample size (N=50) and a short data-collection period, which limits generalizability and statistical power. Self-reported practices may overestimate adherence due to recall and social desirability bias and the study did not include independent verification through chart audits, device inventories or direct observation of monitoring practices. The work also did not link monitoring completeness to patient outcomes, so clinical implications are inferred from established paediatric safety guidance and implementation literature.[13,19,21]

## CONCLUSION

At ODCH, temperature, pulse, respiratory rate and $SpO_2$ are monitored with relatively high consistency, but blood pressure and pain scoring remain major gaps with direct implications for early detection of deterioration and holistic paediatric care. Evidence from comparable settings suggests these gaps are commonly driven by equipment constraints, workload and limited availability of standardized tools and training. Strengthening monitoring reliability at ODCH will likely require ensuring access to paediatric BP cuffs and functional devices, institutionalizing validated pain scales and embedding structured training, supervision and feedback especially if PEWS is being introduced or reinforced.

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## REFERENCES

1. Gormley-Fleming E, Martin D, editors. Children And young people's nursing skills at a glance. John Wiley & Sons. 2018.
2. World Health Organization. Standards for improving the quality of care for small and sick newborns in health facilities. 2006. Available at: https://www.who.int/publications/i/item/9789240010765. Accessed on 4 April 2025.
3. Parker R, Houghton S, Bichard E, McKeever S. Impact of congenital heart disease on siblings: A review. J Child Health Care. 2020;24(2):297-316.
4. Briggs J, Kostakis I, Meredith P, Darbyshire J, Gerry S. Safer and more efficient vital signs monitoring to identify the deteriorating patient: An observational study towards deriving evidence-based protocols for patient surveillance on the general hospital ward. Health Social Care Del Res. 2024;12(6):934.
5. Ogero M, Makone B, Oliwa JN. Effectiveness of routine monitoring of pediatric vital signs in low-income settings. BMJ Global Health. 2018;3(3):732.
6. Cardona-Morrell M, Prgomet M, Turner RM, Nicholson M, Hillman K. Effectiveness of continuous or intermittent vital signs monitoring in preventing adverse events on general wards: a systematic review and meta-analysis. Int J Clin Pract. 2016;70(10):806-24.
7. Redfern OC, Griffiths P, Maruotti A. The association between nurse staffing levels and the timeliness of vital signs monitoring: A retrospective observational study in the UK. BMJ Quality & Safety. 2019;28(9):714–20.
8. Subbe CP, Kruger M, Rutherford P. Validation of a modified Early Warning Score in medical admissions. QJM: An Int J Med. 2001;94(10):521–6.
9. Mackintosh N, Watson K, Rance S. Value of early warning systems in practice: A qualitative study with health care staff. BMJ Quality & Safety. 2014;23(2):171–6.
10. Recio-Saucedo A, Maruotti A, Griffiths P, Smith GB, Meredith PP. Relationships between healthcare staff characteristics and the conduct of vital signs observations at night: Results of a survey and factor analysis. Nursing Open. 2018;5(4):621-33.
11. Odell M, Victor C, Oliver D. Nurses' role in detecting deterioration in ward patients: Systematic literature review. J Advan Nurs. 2009;65(10):1992–2006.
12. Duncan H. What if doctors are always watching, but never there. WIRED. 2001. Available at: https://www.wired.com/story/can-remote-tech-save-livesWIRED. Accessed on 10 September 2025.
13. World Health Organization. Pocket book of hospital care for children: guidelines for the management of common childhood illnesses. 2nd ed. Geneva: World Health Organization. 2013.
14. Gravel J, Opatrny L, Gouin S. High rate of missing vital signs data at triage in a paediatric emergency department. Paediat Child Health. 2006;11(4):211–5.
15. Mwale D, Manda-Taylor L, Langton J. The role of healthcare providers and caregivers in monitoring

critically ill children: a qualitative study in a tertiary hospital, southern Malawi. BMC Health Serv Res. 2024;24(1):595.
16. Muinga N, Abejirinde IOO, Benova L. Implementing a comprehensive newborn monitoring chart: barriers, enablers and opportunities. PLOS Glob Public Health. 2022;2(7):624.
17. Kusi Amponsah A, Kyei EF, Agyemang JB. Nursing-related barriers to children's pain management at selected hospitals in Ghana: a descriptive qualitative study. Pain Res Manag. 2020;2:7160.
18. Kusi Amponsah A, Björn A, Bam V, Axelin A. The effect of educational strategies targeted for nurses on pain assessment and management in children: an integrative review. Pain Manag Nurs. 2019;20(6):604–13.
19. Mills D, Schmid A, Najajreh M. Implementation of a pediatric early warning score tool in a pediatric oncology ward in Palestine. BMC Health Serv Res. 2021;21(1):1159.
20. Gawronski O, Ferro F, Cecchetti C. Adherence to the bedside paediatric early warning system (BedsidePEWS) in a pediatric tertiary care hospital. BMC Health Serv Res. 2021;21(1):852.
21. Agulnik A, Ferrara G, Puerto-Torres M. Assessment of barriers and enablers to implementation of a pediatric early warning system in resource-limited settings. JAMA Netw Open. 2022;5(3):221547.

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