Research Article

Institution-Level Educational and Vocational Support in Selected Child Care Institutions in Tamil Nadu, India: A Cross-Sectional Study

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Abstract

Background: Education and vocational preparation are important components of residential child care. Institution-level service reports can describe provision but do not directly measure children's educational attainment or readiness for adulthood. Objective: To describe reported educational and vocational support and examine institutional characteristics associated with higher recorded-support categories in a purposive sample from Tamil Nadu, India.

Methods: Data from 118 institutional sites were audited against original questionnaire responses. Five educational and five vocational items were summed into separate 0–5 indices and a combined 0–10 index. Study-specific cut-points defined low, moderate and high categories. Six institutional characteristics were included in multivariable ordinal logistic models. The educational model was restricted to exploratory supplementary reporting because the proportional-odds assumption was violated.

Results: High educational, vocational and combined support categories occurred in 13 (11.0%), 9 (7.6%) and 12 (10.2%) sites, respectively. Ongoing staff training was associated with higher vocational support (AOR 7.55, 95% CI 2.71–20.99) and combined support (AOR 7.50, 95% CI 2.74–20.52). Non-NGO management was also positively associated with both outcomes. The vocational staff-training association weakened when the general availability item was omitted in a raw-score sensitivity analysis.

Conclusions: Broad recorded-support packages were uncommon in this sample. Associations depend on measurement choices and should be interpreted as exploratory institutional patterns, not causal effects or child outcomes. Heterogeneous score components and possible shared-organization clustering limit inference.

Keywords: child care institutions; residential care; educational support; vocational training; service availability; Tamil Nadu.

1. Introduction

Residential child care requires attention to educational continuity, development, and preparation for life beyond care. The Indian child-protection framework and Mission Vatsalya provide an institutional context for care and rehabilitation (Ministry of Women and Child Development, 2022). However, the presence of a service on a questionnaire does not establish its quality, accessibility, or effectiveness. Describing recorded provision is therefore a preliminary step toward evaluating whether institutional care meets children's needs.

Reviews of education in residential care emphasize the importance of staff support, relationships, expectations and the wider institutional environment (Garcia-Molsosa et al., 2021; McCormick et al., 2026). These influences operate alongside children's previous experiences and schooling trajectories. Institution-level service indicators should consequently be distinguished from child-level attainment, attendance, aspirations and educational progression.

Vocational preparation and transition support are also relevant to young people approaching adulthood. A systematic review of longitudinal studies identified interconnected domains of independent-living skills, including education planning and job seeking, rather than a single measure of readiness (Starr et al., 2024). Indian research has described challenges in rehabilitation and social reintegration, as well as varied support after leaving care (Dutta, 2016, 2017; Wanglar, 2021; Udayan Care, 2019). Research on support during the COVID-19 pandemic further illustrates the importance of examining the circumstances and forms of assistance available to care leavers (Modi & Kalra, 2022).

Institutional characteristics may be associated with reported service provision. Staff development, management structure, resources and location can plausibly relate to service breadth, but cross-sectional associations do not establish their effects. Measures collected in a mental-health service survey may also capture wider organizational investment rather than education-specific practices. Their original wording must be retained in interpretation.

This study describes educational, vocational and combined recorded-support indices in selected child care institutions in Tamil Nadu and examines associations with six institutional characteristics. The research question was: how do reported support categories vary across the sampled sites, and which institutional characteristics are associated with higher vocational and combined support categories? Educational support is described, with its ordinal regression retained as exploratory supplementary analysis. The indices summarize reported items; they do not measure children's attainment, employability or readiness for independent living. The analysis uses the same parent survey as a companion study of mental health service availability, while examining different outcomes.

2. Methods

2.1 Design, setting and unit of observation

This cross-sectional institution-level analysis used 118 institutional sites from a parent survey in selected areas of Tamil Nadu, India. The worksheet includes Chennai (39 sites), Coimbatore (29), Tiruchirappalli (23), Nagapattinam (20), Kanyakumari (5) and Ramanathapuram (2). The supplied derived sheets classified the first three district groups as urban and the latter three as rural. This grouping was retained and should not be interpreted as independently verified official locality classification. Recorded response timestamps ranged from 7 October 2024 to 6 June 2025. The earlier parent-survey draft describes an overall study period of October 2024 to September 2025; timestamp coverage alone does not verify the full recruitment period.

The institutional site was the unit of analysis. Four repeated-name pairs were reviewed with the study author, who confirmed that they were different branches rather than repeat interviews. All 118 sites were therefore retained. Separate branches may share organizational management or resources; parent-organization identifiers were not available for cluster-adjusted analysis.

2.2 Recruitment and sample size

The parent study describes purposive recruitment of operational, registered residential child care institutions whose authorized representatives consented to participation. A complete sampling frame was not available. The original planning calculation used a single-proportion formula with Z=1.96, p=0.50 and d=0.05, yielding approximately 384 institutions. The achieved survey contained 118 sites. This analysis used the available records; the nominal precision of the original probability-sampling calculation does not apply to this purposive sample. The workbook does not document the total approached, refusal count, recruitment list or registration verification procedure, so a response rate cannot be calculated.

2.3 Questionnaire and predictors

The parent-study documentation describes standardized interviews with institutional administrators or senior staff, a pilot in 11 institutions excluded from the analytic sample, and expert review of questionnaire relevance. These procedures do not establish external validity of the present support indices or cut-points. Responses were not independently audited against program records, and the workbook does not establish the reference period, interview language or exact operational definitions of every service item.

Predictors were worksheet urban/rural group, management, reported number of resident children per 10 children, ongoing staff training, involvement of guardians or external caregivers in mental-health interventions, and post-intervention follow-up/aftercare. The last two items concern mental-health services and were not treated as direct measures of educational caregiver engagement or transition-to-adulthood aftercare. The staff-training question was also located in the mental-health survey section; its training content cannot be assumed to be education-specific. Management was reconstructed from the original responses: 92 NGO, 24 private and 2 government sites. Private and government sites were pooled as non-NGO for regression because the government group was very small. These six predictors were included based on their relevance to institutional characteristics and service provision. All multivariable findings were interpreted as exploratory because of the cross-sectional design and purposive sampling.

2.4 Data audit and score construction

Original questionnaire responses were treated as the source for rebuilding derived variables. Two vocational coding errors were repaired: one record selected crafts, technical and computer training but had only crafts coded, and another selected crafts but was coded as technical training. A blank derived higher-secondary code at worksheet row 25 was set to zero because the original response selected secondary schooling only. Three-category management coding was separated from binary non-NGO regression coding. Total resident children was recalculated as the reported male plus female totals. Original answers and identifiers were preserved, and all corrections were logged.

The educational index summed educational facilities, continuing-education support, and selected primary, secondary and higher-secondary education levels (0–5). The vocational index summed the general availability-of-vocational-training item and selected crafts, technical, computer and medical-skills training (0–5). Each available/selected item contributed one point. The combined index summed the two domains (0–10). Educational and vocational categories were low (0–1), moderate (2–3) and high (4–5); combined categories were low (0–3), moderate (4–6) and high (7–10). Equal weighting and cut-points were study-specific and were not externally validated.

General availability and specific selections were scored independently. There were 72 sites with vocational availability recorded as “no” but at least one training/activity type selected. The study author clarified that the general item referred to formal vocational courses, while crafts, computer or technical selections could represent informal activities. These answers were preserved, and the index therefore combines formal-course availability with reported activity types. There were also 59 sites with educational facilities recorded as “no” but a school education level selected. Education-level items refer to primary,

secondary and higher-secondary schooling; they do not by themselves establish that teaching occurs onsite. The study author confirmed that “NA” at vocational source row 55 meant not available and that “NA” at education source row 59 meant none available. Both therefore contributed zero selected-type indicators and were retained in the main analysis. “NIL” also contributed zero selected-type indicators. Availability remains self-reported rather than independently audited.

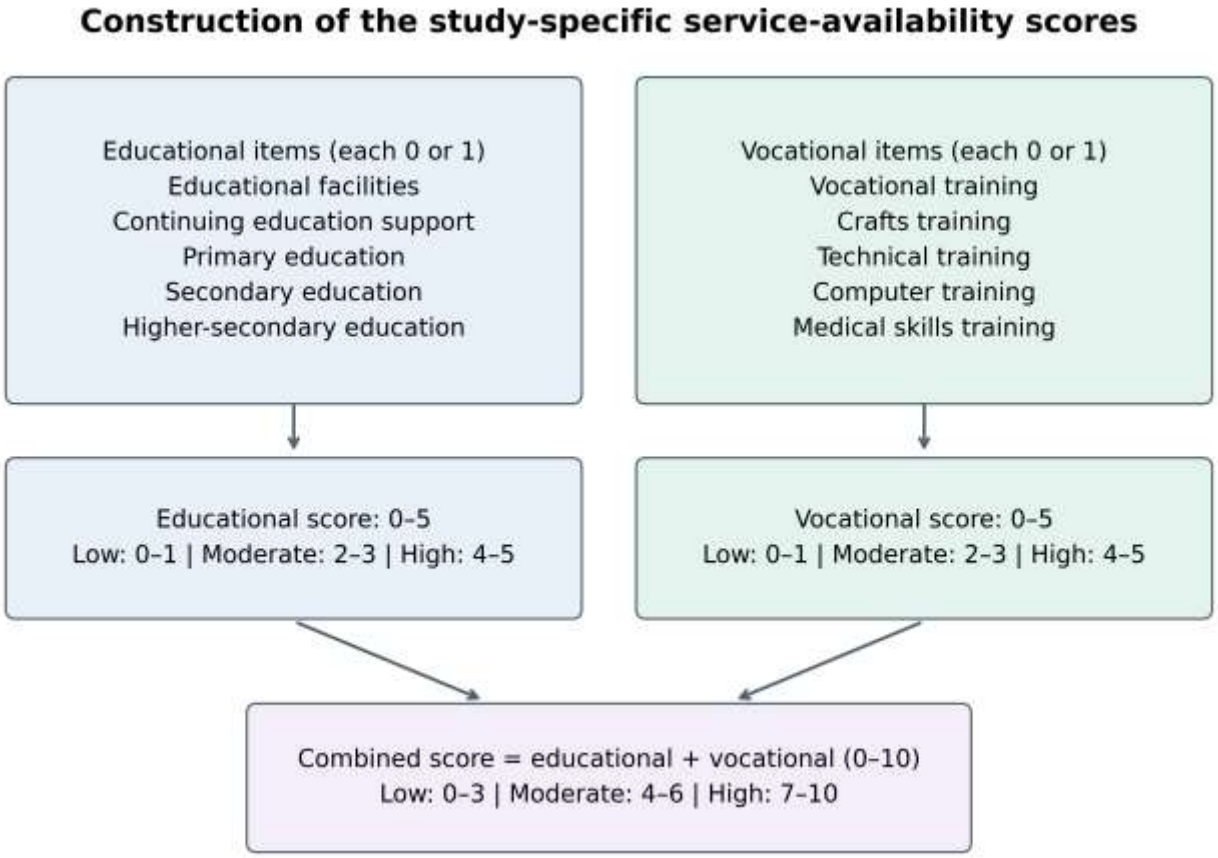


Figure 1. Construction of study-specific recorded-item educational, vocational and combined support indices. Each reported-available or selected item contributes one point. Arrows show arithmetic construction, not causation. These indices are not validated measures of child readiness, service quality or age-appropriate access. General availability and selected types were scored independently.

2.5 Statistical analysis

Analyses used Python with statsmodels 0.15.0, scipy 1.17.0 and numpy 2.3.5. Frequencies and sample percentages described categorical variables, and mean, sample SD and range described resident totals. The analyzed binary predictor responses and source item selections were present for all 118 sites; the two NA responses were confirmed by the study author as not available and coded zero. No imputation was performed. Twenty-seven records had inconsistent age-band subtotals relative to reported male/female totals; age composition was therefore not used as an adjustment variable.

Proportional-odds cumulative logistic models were fitted by maximum likelihood with categories ordered low < moderate < high. Each included all six predictors. AORs above 1 represent greater cumulative odds of a higher category. Wald 95% CIs were calculated from coefficient standard errors. Model improvement was assessed by likelihood-ratio comparisons with intercept-only models (df=6). Convergence, maximum absolute score-gradient values, and agreement of BFGS and L-BFGS optimizers were checked. Quadratic institution-size terms were tested as a functional-form check. VIFs were computed using the predictor matrix with an intercept.

A generalized cumulative-logit comparison allowed all six slopes to differ between the two cumulative thresholds and constrained the cumulative probabilities to remain ordered at observed covariate patterns. Likelihood-ratio comparisons used six additional slope parameters. The educational comparison indicated non-proportional odds, and its generalized fit had a very large slope, consistent with sparsity/separation where no rural record was high educational support. Common educational AORs were therefore moved to an explicitly exploratory supplement; no stable threshold-specific educational

effects are claimed. The vocational and combined models are reported in the main results, although sparse high categories and the small non-probability sample still limit inference.

A management sensitivity analysis excluded the two government sites (N=116). No records were excluded because of NA responses after their meaning was confirmed. The earlier hypothetical repeated-name exclusion was withdrawn after the author confirmed separate branches. As an additional check on categorization and overlapping items, raw-score linear regressions with HC3 heteroskedasticity-robust intervals examined the original summed scores and scores omitting the broad educational-facilities and general vocational-availability items. These exploratory mean-difference models do not validate score construction or provide an alternative measure of readiness. Two-sided p values are reported without multiplicity correction; neither predictor selection nor sensitivity checks should be interpreted as confirmatory hypothesis testing.

2.6 Ethics

The parent-study documentation reports approval by the Institutional Ethics Committee of NIMS University (NIMSUR/IEC/2024/1227), administrative permission and written informed consent from authorized institutional representatives. The present manuscript reports aggregate findings and does not identify children or institutions. Children were not interviewed in this institution-level analysis.

3. Results

3.1 Sample characteristics

The 118 sites comprised 91 urban-group sites (77.1%) and 27 rural-group sites (22.9%). NGO management accounted for 92 (78.0%), private management for 24 (20.3%) and government management for 2 (1.7%). Ongoing staff training was reported in 43 (36.4%), guardians/external caregivers' involvement in mental-health interventions in 21 (17.8%), and mental-health follow-up/aftercare in 36 (30.5%). The mean reported resident total was 48.4 children (SD 24.8; range 5–150).

Table 1. Characteristics of institutional sites (N=118)

Characteristic	Category	n	%
Worksheet location	Urban	91	77.1
	Rural	27	22.9
Management	NGO	92	78.0
	Private	24	20.3
	Government	2	1.7
Ongoing staff training	Yes	43	36.4
Guardian involvement in MH interventions	Yes	21	17.8
MH follow-up/aftercare	Yes	36	30.5

MH, mental health. Binary "no" counts are the complement of the displayed "yes" counts. Resident children: mean 48.4 (SD 24.8), range 5–150. Location is the supplied worksheet grouping. Private/government sites were pooled only for regression.

3.2 Recorded service items and support categories

Educational facilities and continuing-education support were reported in 58 (49.2%) and 56 (47.5%) records. Primary, secondary and higher-secondary levels were selected in 25 (21.2%), 32 (27.1%) and 89 (75.4%). Vocational availability was reported in 44 (37.3%). Crafts, technical, computer and medical-skills training were selected in 51 (43.2%), 52 (44.1%), 49 (41.5%) and 1 (0.8%) sites, respectively. Educational categories remained low in 51 (43.2%), moderate in 54 (45.8%) and high in 13 (11.0%) records. Corrected vocational categories were low in 64 (54.2%), moderate in 45 (38.1%) and high in 9 (7.6%). Corrected combined categories were low in 61 (51.7%), moderate in 45 (38.1%) and high in 12 (10.2%). These percentages describe the sampled sites rather than population prevalence. All 13 high educational records belonged to the urban worksheet group; none belonged to the rural group.

Table 2. Support-category distributions (N=118)

Domain	Low, n (%)	Moderate, n (%)	High, n (%)
Education	51 (43.2)	54 (45.8)	13 (11.0)
Vocational	64 (54.2)	45 (38.1)	9 (7.6)
Combined	61 (51.7)	45 (38.1)	12 (10.2)

Educational/vocational category ranges: 0–1, 2–3 and 4–5. Combined ranges: 0–3, 4–6 and 7–10. Percentages may total 99.9 or 100.1 because of rounding. Categories are study-specific.

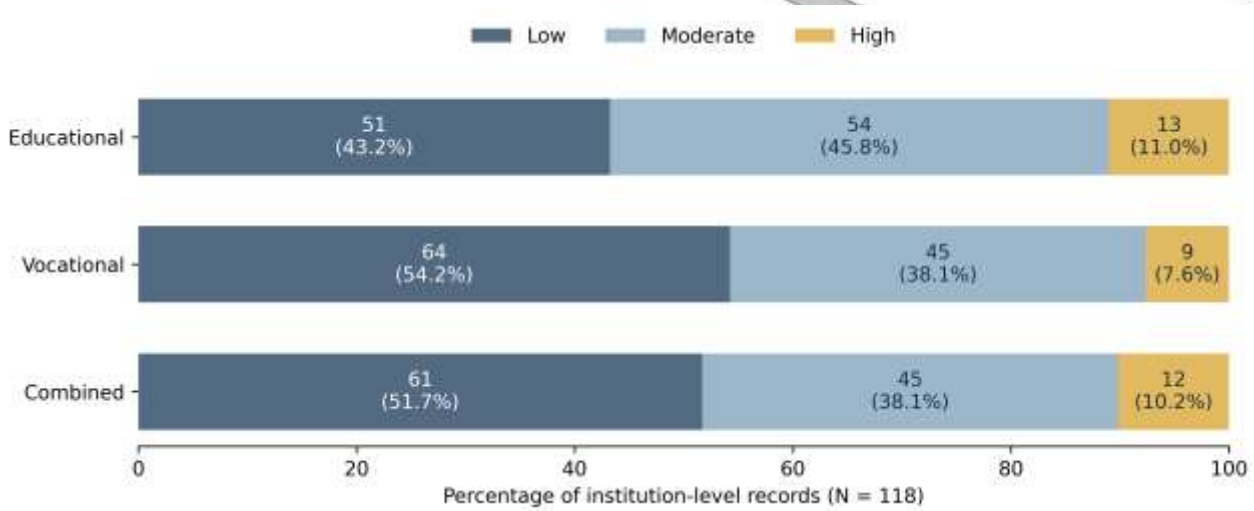


Figure 2. Distribution of reported support categories among 118 institutional sites. Labels show counts and sample percentages. Educational/vocational: low 0–1, moderate 2–3, high 4–5; combined: low 0–3, moderate 4–6, high 7–10. Repeated institution names were confirmed as separate branches.

3.3 Adjusted vocational and combined associations

In the vocational model, non-NGO management was associated with higher categories (AOR 6.13, 95% CI 2.24–16.78; p<0.001), as was ongoing staff training (AOR 7.55, 2.71–20.99; p<0.001). Mental-health follow-up/aftercare was inversely associated (AOR 0.31, 0.10–0.89; p=0.030). Worksheet location, institution size and guardian involvement did not show clear adjusted associations. The follow-up/aftercare estimate does not establish any detrimental effect of aftercare, and the item does not directly measure transition support.

For combined support, rural-group location was associated with lower categories (AOR 0.17, 95% CI 0.04–0.76; p=0.020). Non-NGO management (AOR 4.42, 1.59–12.25; p=0.004) and ongoing staff training (AOR 7.50, 2.74–20.52; p<0.001) were positively associated. Size, guardian involvement and mental-health follow-up/aftercare had intervals that included 1.

Table 3. Adjusted ordinal logistic associations

Predictor/contrast	Vocational AOR (95% CI)	p	Combined AOR (95% CI)	p
Rural vs urban (worksheet classification)	0.40 (0.13–1.21)	0.106	0.17 (0.04–0.76)	0.020
Non-NGO vs NGO	6.13 (2.24–16.78)	<0.001	4.42 (1.59–12.25)	0.004
Size, per 10 children	0.97 (0.83–1.13)	0.687	1.02 (0.87–1.20)	0.778
Ongoing staff training, yes vs no	7.55 (2.71–20.99)	<0.001	7.50 (2.74–20.52)	<0.001
Guardians/external caregivers involved in mental health interventions, yes vs no	0.88 (0.30–2.59)	0.816	2.26 (0.80–6.37)	0.122
Mental-health follow-up/aftercare, yes vs no	0.31 (0.10–0.89)	0.030	1.26 (0.46–3.44)	0.650

AOR, adjusted odds ratio; CI, confidence interval. Both models included all six predictors and 118 sites. Reference groups are urban worksheet group, NGO and “no”. Size is per 10 children. Non-NGO combines 24 private and 2 government sites. The educational model is reported separately in Supplementary Table S1 because the proportional-odds assumption was not satisfied.

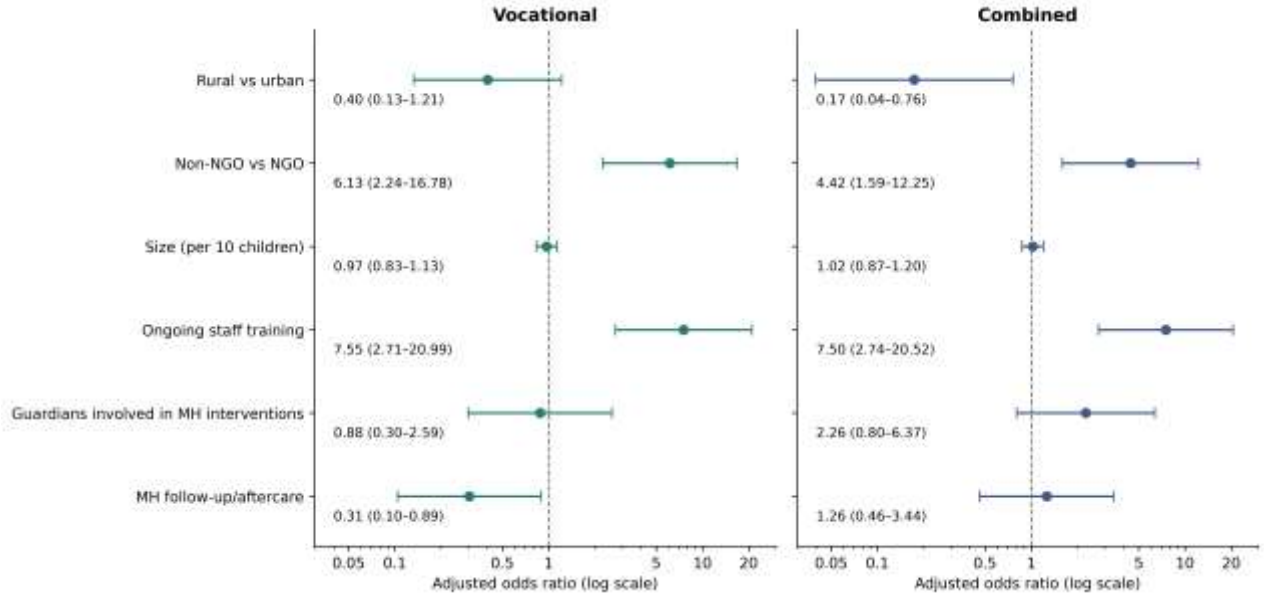


Figure 3. Adjusted associations with higher vocational and combined recorded-support categories. Points show AORs and bars show Wald 95% CIs; the dashed line marks AOR=1. Models included all six listed predictors. MH denotes mental health. The educational model is presented separately in Supplementary Table S1 because the proportional-odds assumption was not satisfied.

3.4 Model diagnostics and sensitivity checks

Both main models converged. Maximum absolute likelihood score gradients were below 0.000001. Vocational and combined models improved fit over intercept-only models, with LR chi-square values of 36.36 and 62.13 (df=6; both p<0.001) and AIC values of 191.03 and 175.98. Generalized cumulative-logit comparisons gave p=0.593 for vocational and p=0.570 for combined support, without detected departures from proportional odds at the conventional threshold. Failure to detect a departure does not prove the assumption. A quadratic size term did not clearly improve the main vocational (p=0.801) or combined model (p=0.141). Optimizer log-likelihoods agreed within 0.000001. Maximum VIF was 1.577. The educational model showed evidence of departure from the proportional-odds assumption (p=0.043) and is therefore presented as an exploratory analysis in Supplementary Table S1.

Table 4. Model diagnostics

Model	N	LR χ^2 (df=6)	LR p	AIC	PO LR (df=6)	PO p
Vocational	118	36.36	<0.001	191.03	4.62	0.593
Combined	118	62.13	<0.001	175.98	4.80	0.570

PO, proportional odds. The educational model is reported separately in Supplementary Table S1 because the proportional-odds assumption was not satisfied. Comparisons constrain cumulative probabilities to remain ordered over observed predictor patterns.

Sensitivity analyses supported the general direction of the main findings. After excluding the two government institutions, staff training remained positively associated with vocational and combined support. However, the strength of the vocational association was reduced when the broad vocational-availability item was excluded from the score. This finding suggests that the observed association is partly dependent on score construction and should therefore be interpreted cautiously.

4. Discussion

This analysis describes the breadth of separately recorded educational and vocational items in a purposive institution-level survey. High categories were uncommon, and the low vocational category was more frequent than the low educational category. The correction of source-derived coding increased the high vocational count to nine and changed the combined distribution. These results emphasize the need to verify derived spreadsheets before interpreting apparently stable findings across drafts.

Ongoing staff training was associated with higher vocational and combined categories, but its interpretation is narrower than a claim that training improves educational or employment outcomes. Training was recorded in a mental-health service questionnaire, and its content, dose and duration were not established. Staff training may mark broader organizational resources, management investment or reporting practices. Reviews of residential education describe the relevance of staff

relationships and institutional expectations (Garcia-Molsosa et al., 2021; McCormick et al., 2026), but those findings do not establish causality for the present associations.

The association between staff training and vocational support was weaker when the broad vocational-availability item was removed from the score. This indicates that the magnitude of the observed association may partly depend on score construction. Future studies should therefore distinguish formal vocational-course availability from specific vocational activities, participation, certification, and service quality.

The rural-group association with combined support warrants further investigation, but the supplied urban/rural variable grouped records by district rather than an independently verified locality rule. Mechanisms such as travel distance, access to training providers, or staffing were not modeled. Institutions' age composition and service eligibility may also affect which education levels or training types can appropriately be selected. A lower index should not automatically be interpreted as poorer care.

Non-NGO sites had higher vocational and combined categories in the adjusted models. The pooled group was mainly private institutions and included only two government sites. It cannot establish an advantage of government management or a causal management effect. Funding, resident needs, staffing and institutional size distribution may differ between groups, and most of those potential confounders were unmeasured in the presented analysis.

The inverse association between mental-health follow-up/aftercare and vocational categories concerns a post-intervention mental-health item, not comprehensive care-leaving support. It may reflect case mix, alternative service priorities or measurement structure. Indian studies and the Beyond 18 report describe the importance of sustained transition support (Dutta, 2017; Udayan Care, 2019), and the present estimate is not evidence against that support. Children and care leavers were not interviewed, so the results cannot establish participation, qualifications, employment or independent-living outcomes.

The distinction between formal courses and informal vocational activities explains why specific activities can be selected despite a "no" response to formal-course availability. The score consequently summarizes a heterogeneous combination of provision and activity breadth, rather than five interchangeable measures of formal training. School-level items likewise describe primary, secondary and higher-secondary schooling without confirming onsite facilities. Medical-skills activities still require an age-appropriate definition. These distinctions support interpretation of the indices as recorded-item summaries rather than audited service-capacity measures.

4.1 Strengths and limitations

A strength of this study is the reconstruction of educational and vocational support indices from the original questionnaire responses, together with verification of source-derived coding and sensitivity analyses examining alternative score definitions. The institution-level perspective provides information on reported service provision while maintaining a clear distinction between institutional support and child-level educational or vocational outcomes.

Purposive recruitment and incomplete recruitment documentation prevent population inference and response-rate estimation. The cross-sectional design cannot establish causality or temporal order, and shared respondents may create common-method reporting bias. Service availability was not independently verified. The equal-weighted indices combine heterogeneous and potentially overlapping items, and their cut-points are unvalidated. The distinction between formal courses and informal activities limits interpretation of the vocational composite. Reliable age composition could not be established from inconsistent subtotals, and age-specific applicability, participation, quality and institutional resources were not adequately represented in the models.

High-category counts were small, confidence intervals were wide, and the non-NGO category pooled unlike management types. The educational ordinal model violated proportional odds, and a flexible comparison exhibited unstable large slopes; its common AORs are supplementary exploratory summaries only. Multiple related outcomes and sensitivity checks were examined without multiplicity adjustment. The combined outcome incorporates both domains and is not independent replication. The author confirmed that repeated-name sites were separate branches. However, branches within an organization may share resources or management, creating correlated observations. Parent-organization identifiers were unavailable, and the models did not adjust standard errors for organizational clustering. These limitations restrict the generalizability and strength of all adjusted inferences.

4.2 Implications

A practical next step is to verify service inventories against institutional records and clarify whether education and training occur onsite or through external providers. Assessment should include age-appropriate eligibility, participation, course quality and children's perspectives. Staff development and referral partnerships merit prospective evaluation, with attention to organizational resources and locality. Future work should use unique institution identifiers, documented recruitment and a validated service inventory, and link institutional provision to child-level outcomes over time.

5. Conclusion

High levels of recorded educational and vocational support were uncommon among the 118 participating child care institutions. Ongoing staff training and non-NGO management were associated with higher vocational and combined support categories, while rural location was associated with lower combined support. However, the magnitude of some associations was influenced by score construction, and the educational ordinal model did not satisfy the proportional-odds assumption. These findings should therefore be interpreted as exploratory institution-level associations rather than evidence of causal effects or child-level outcomes. Strengthening institutional service capacity, staff development and access to educational and vocational opportunities may warrant further evaluation using validated measures and larger, representative samples.

Declarations

Ethics Approval and Consent to Participate: Ethical approval was obtained from the Institutional Ethics Committee of NIMS University (NIMSUR/IEC/2024/1227). Written informed consent was obtained from authorized institutional representatives prior to participation. The study involved institution-level data and did not include direct interviews with children.

Consent for Publication: Not applicable.

Availability of Data and Materials: The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request, subject to ethical and confidentiality considerations. Institution-identifying information will not be made publicly available.

Competing Interests: The authors declare that they have no competing interests.

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Authors' Contributions: Jasintha Ashokan contributed to the conceptualization of the study, data collection, data analysis, interpretation of findings, and preparation of the original manuscript draft. Dr Kailash Chandra Verma provided study supervision, reviewed the manuscript, and read and approved the final version. Shubhanjali Roy made substantial intellectual contributions to the study through methodological guidance, interpretation of the findings, critical review and refinement of the manuscript, and overall improvement of its scientific content and presentation. All authors read and approved the final manuscript.

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Supplementary tables

Supplementary Table S1. The educational proportional-odds model showed evidence of assumption violation (LR $\chi^2(6)=12.98$, p=0.043). Results are therefore presented as exploratory common-odds estimates and should not be interpreted as stable threshold-specific effects

Predictor	Exploratory AOR (95% CI)	p
Rural vs urban (worksheet classification)	0.32 (0.10–0.99)	0.048
Non-NGO vs NGO	1.34 (0.53–3.42)	0.538
Size, per 10 children	0.94 (0.81–1.10)	0.452
Ongoing staff training, yes vs no	5.95 (2.04–17.40)	0.001
Guardians/external caregivers involved in mental health interventions, yes vs no	3.63 (1.21–10.84)	0.021
Mental-health follow-up/aftercare, yes vs no	2.96 (1.00–8.75)	0.050

Educational model N=118; LR $\chi^2(6)=61.30$, $p<0.001$; AIC=182.04. Wald intervals use the common-slope model despite its assumption violation. Aftercare unrounded p=0.0498 rounds to 0.050; it is not a robust threshold-specific finding.