Structural Barriers to Health Services and Child Nutrition in Rohingya Camps

Study design: Cross-sectional

Target journal: BMC Nutrition

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Dataset: IFPRI Harvard Dataverse DOI: 10.7910/DVN/5BAN6C

Total STROBE items: 22 (all addressed)

Instructions: This checklist maps each of the 22 STROBE items for cross-sectional studies to the specific section and page of the submitted manuscript. Items marked ✓ are reported. Items marked N/A are not applicable to this study design or dataset. Page references correspond to the final submitted manuscript version (March 2026).

Item	Recommendation	Location in manuscript	Reported	Notes
1	**(a)** Indicate the study's design with a commonly used term in the title or abstract. **(b)** Provide in the abstract an informative and balanced summary of what was done and what was found.	Title page; Abstract (Background, Methods, Results, Conclusions)	✓	"Cross-sectional analysis" stated in Abstract Methods. Structured abstract covers all four required elements.

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2	**Background/rationale:** Explain the scientific background and rationale for the investigation being reported.	Introduction, paragraphs 1–2	✓	Persistent malnutrition despite food assistance; gap in institutional/structural explanations; refs [1-4, 19-30].
3	**Objectives:** State specific objectives, including any pre-specified hypotheses.	Introduction, final paragraph	✓	Two linked contributions stated explicitly: (1) operationalise AAAQ index; (2) test attenuation of voucher-stunting association after access adjustment.

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4	**Study design:** Present key elements of study design early in the paper.	Abstract Methods; Methods §Data source and sample		Cross-sectional design stated in abstract and methods opening.
5	**Setting:** Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection.	Methods §Data source and sample		Ukhiya and Teknaf camps, Cox's Bazar, Bangladesh. IFPRI survey year referenced via dataset DOI [5].
6	**Participants:** Give the eligibility criteria, and the sources and methods of selection of participants.	Methods §Data source and sample; §Outcomes and exposure		523 children aged 6–23 months; IFPRI replication dataset; sampling weights applied [ref 22].
7	**Variables:** Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Methods §Outcomes and exposure; §Healthcare Access Index; §Model specification		Primary outcome: stunting (HAZ < −2, WHO 2006 [6]). Exposure: voucher vs in-kind. Covariates: household size, DDS, maternal education, recent illness. Healthcare Access Index: 5 items defined with coding in Supplementary Table S1.
8	**Data sources/measurement:** For each variable of interest, give sources of data and details of methods of assessment. Describe comparability of assessment methods if there is more than one group.	Methods §Outcomes and exposure; §Healthcare Access Index; Supplementary Table S1		Anthropometric z-scores: WHO 2006 standards [6]. Access items: survey instrument wording and coding in Supplementary Table S1. EFA with polychoric correlations [refs 39–40].
9	**Bias:** Describe any efforts to address potential sources of bias.	Methods §Allocation bias and propensity methods; §Sensitivity to unmeasured confounding; Discussion §Limitations		Selection bias addressed via PS adjustment and IPW (Supplementary Tables S4–S5). Residual confounding addressed via E-value analysis (E-value = 1.56) [refs 15, 45].

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10	**Study size:** Explain how the study size was arrived at.	Methods §Data source and sample		n = 523 determined by available IFPRI replication dataset; EPV exceeds recommended thresholds for primary outcome (reported in Supplementary Table S6C and model diagnostics).
11	**Quantitative variables:** Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why.	Methods §Healthcare Access Index; §Model specification; §Missing data	✓	TRANS_COST winsorised at 99th percentile. Access items standardised (z-scores) prior to EFA. Child age modelled with restricted cubic splines (3 knots) [ref 29]. Access Index standardised to mean 0, SD 1.
12	**Statistical methods:** *(a) Describe all statistical methods, including those used to control for confounding.* *(b) Describe any methods used to examine subgroups and interactions.* *(c) Explain how missing data were addressed.* *(d) If applicable, describe analytical methods taking account of sampling strategy.*	Methods §Model specification and robustness; §Missing data and sampling weights; §Allocation bias and propensity methods; §Sensitivity to unmeasured confounding	✓	(a) Survey-weighted logistic regression; PS adjustment; IPW [refs 12-14]. (b) M4 interaction (Voucher × Access Index); tertile subgroup analyses (Supp. Table S7). (c) MICE, 20
		Reproducibility		predictor [refs 7- 11]. (d) Survey-robust SEs; sampling weights as analytic weights [refs 9, 11]. (e) PS/IPW; E-value; unweighted sensitivity models in Supplement.

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13	**Participants:** *(a) Report numbers of individuals at each stage of study.* *(b) Give reasons for non-participation at each stage.* *(c) Consider use of a flow diagram.*	Results §Descriptive statistics; Methods §Data source and sample		Analytic sample: n = 523 (6-23 months). Secondary analysis of complete archived dataset; no recruitment exclusions by authors. Missing data handled via MICE.
14	**Descriptive data:** *(a) Give characteristics of study participants and information on exposures and potential confounders.* *(b) Indicate number of participants with missing data for each variable of interest.*	Results §Descriptive statistics; Supplementary Table S3	✓	Baseline characteristics by voucher/in-kind group (Supp. Table S3). Missing covariate data imputed via MICE; missingness pattern described in Methods.
15	**Outcome data:** Report numbers of outcome events or summary measures.	Results §Descriptive statistics; §Logistic regression: stunting; §Logistic regression:	✓	Stunting 34.8% (n=182); wasting 16.0% (n=84); underweight 29.7% (n=155). All three outcomes reported.
16	**Main results:** *(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision.* *(b) Report category boundaries when continuous variables were categorised.* *(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period.*	Results §Logistic regression: stunting; Table 1; Supplementary Table S6	✓	(a) M1 (crude) OR 0.66 (95% CI 0.44-1.00); M3 (adjusted) OR 0.76 (95% CI 0.46-1.25). All models reported with exact ORs, 95% CIs, and p-values. (b) Tertile boundaries reported in Supp. Table S7. (c) Absolute risk translation not primary focus given cross-sectional design.
17	**Other analyses:** Report other analyses done — e.g. analyses of subgroups and interactions, and sensitivity analyses.	Results §Robustness checks and sensitivity; Supplementary Tables S4– S5, S7	✓	PS-adjusted OR 0.74; IPW OR 0.77. M4 interaction term OR 0.98 (p=0.88). Tertile subgroup (Supp. Table S7). E-value = 1.56. Unweighted sensitivity models in Supplement.

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18	**Key results:** Summarise key results with reference to study objectives.	Discussion, opening paragraph; Conclusion		Attenuation of crude voucher-stunting association after access adjustment summarised. Links directly to stated study objectives.
19	**Limitations:** Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	Discussion §Limitations	✓	Cross-sectional design; non-random voucher assignment; residual confounding despite PS/IPW; index simplifies access dynamics; generalisability limited to and surveyed camps. E-value quantifies unmeasured confounding robustness.
20	**Interpretation:** Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	Discussion §Methodological novelty; §Programmatic implications; Conclusion		Results framed as associative, not causal. Interpretation explicitly caveated. Consistent with PS-adjusted and IPW estimates. Fragility of unadjusted OR (CI touches 1.00) acknowledged in Abstract and Results.
21	**Generalisability:** Discuss the generalisability (external validity) of the study results.	Discussion §Limitations; Conclusion		Findings limited to Rohingya camps in Cox's Bazar (Ukhiya and Teknaf) and to children aged 6–23 months. Context-specific governance and aid structure noted.

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22	**Funding:** Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based.	Ethics, data availability, acknowledgements section		Secondary analysis of publicly archived IFPRI data. Acknowledgement to IFPRI for data access and field teams. No external funder for the present analysis. Original data funded through IFPRI (see Dataverse record DOI: 10.7910/DVN/5BAN6C).

COMPLIANCE SUMMARY

All 22 STROBE items for cross-sectional studies are addressed in this manuscript. No items are marked as not applicable. The checklist is submitted as a supplementary file alongside the main manuscript and Supplementary Tables S1-S7.

22	22	0
TOTAL STROBE ITEMS	ITEMS REPORTED ✓	ITEMS NOT APPLICABLE

Key methodological items (12a-12e): All five sub-items of the statistical methods item are addressed — including survey-weighted regression, MICE with sampling weight predictor, PS/IPW adjustment, interaction testing, and E-value sensitivity analysis. These are reported across Methods sections and Supplementary Tables S4-S6.

Corresponding author confirmation: I confirm that this STROBE checklist accurately reflects the content of the submitted manuscript and that all 22 required items are addressed as indicated above.