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REVIEWER'S REPORT

Manuscript No.: IJAR-57964

Title: Impact of Socioeconomic Factors on Child Survival Among Under-Five Children in Conakry, Guinea: Descriptive Analysis, Association Tests and Penalised Logistic Regression.

Recommendation:
Accept as it is .....
Accept after minor revision.....
Accept after major revision .....YES
Do not accept (*Reasons below*) .....

Rating	Excel.	Good	Fair	Poor
Originality		√		
Techn. Quality			√	
Clarity		√		
Significance		√		

Reviewer's ID: JPR-094

Detailed Reviewer's Report

 # Reviewer's Report

****Manuscript Title:** *Impact of Socioeconomic Factors on Child Survival Among Under-Five Children in Conakry, Guinea: Descriptive Analysis, Association Tests and Penalised Logistic Regression***

Overall Evaluation

The manuscript addresses an important public health issue in Guinea by examining determinants of under-five mortality using DHS data and penalized logistic regression. The topic is relevant and potentially valuable for policymakers. However, there are substantial methodological, analytical, interpretational, and reporting concerns that limit confidence in the findings. Several statistical conclusions appear

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inconsistent with the presented data, and some methodological choices require stronger justification.

****Recommendation: Major Revision****

 # 1. Strengths

1. Public Health Relevance

*** Under-five mortality remains a major challenge in Sub-Saharan Africa.**
*** Findings may help guide interventions in Guinea.**

2. Use of National DHS Data

*** DHS datasets are internationally recognized and widely used.**
*** Provides standardized demographic and health indicators.**

3. Consideration of Rare Event Modeling

*** Authors recognize the problem of complete separation due to low mortality prevalence.**
*** Attempt to use penalized regression is commendable.**

4. Clear Study Objectives

*** Objectives are clearly stated.**

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*** Analytical framework follows a logical progression from descriptive analysis to multivariable modeling.**

5. Inclusion of Multicollinearity Assessment

*** VIF assessment demonstrates awareness of model diagnostics.**

 # 2. Weaknesses

Major Weaknesses

A. Inconsistency Between Data Source and Sampling Description

The manuscript states that DHS data were collected from mothers or guardians who attended health facilities in Conakry.

****Problem:****
DHS surveys are household-based population surveys, not facility-based surveys.

****Impact:****
Raises concerns regarding data source understanding and sample representativeness.

B. Implausible Mortality-Diarrhoea Relationship

The manuscript reports:

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*** 38 children had diarrhoea.**

*** 23 died.**

*** Case fatality rate = 60.5%.**

This is extraordinarily high and inconsistent with typical DHS cross-sectional datasets.

****Concern:****

Possible coding error or reverse interpretation of variables.

C. Complete Separation Indicates Data Quality Issues

Authors report:

> No child without diarrhoea died.

This is highly unusual for a sample of 696 children.

****Concern:****

Outcome coding should be rechecked.

D. Lasso Regression Methodology Poorly Described

The manuscript states:

> Lasso regularisation (α = 0.5)

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but does not explain:

*** Cross-validation procedure.**
*** Penalty selection method.**
*** Model tuning.**
*** Variable coding.**
*** Handling of categorical predictors.**

E. Odds Ratio Interpretation Errors

Table 4 reports:

| Variable | OR |
| --- | --- |
| Diarrhoea | 0.001 |

Authors interpret this as:

> Major risk factor for death

However:

OR < 1 indicates decreased odds of the outcome coded as 1.

Since survival was coded as:

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Alive = 1

then OR=0.001 means diarrhoea strongly decreases survival.

Interpretation requires clarification throughout the manuscript.

F. Exclusive Breastfeeding Interpretation

The manuscript finds:

*** Breastfeeding associated with higher mortality.**

Authors attribute this entirely to reverse causality.

However:

*** No evidence is presented.**
*** Alternative explanations are not explored.**

This interpretation is speculative.

G. No Survey Design Adjustment

DHS data require:

*** Sampling weights**

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*** Clustering adjustment**

*** Stratification adjustment**

These procedures were not reported.

This may bias estimates and p-values.

H. Cross-sectional Design Limits Causal Inference

Several statements imply causality:

*** "Diarrhoea is the leading determinant."**

*** "Maternal education protects."**

Only associations can be concluded.

 # 3. Key Points Requiring Revision

Introduction

Issue 1

Line 29–30:

> Socioeconomic determinants household income, maternal education...

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Missing punctuation.

Issue 2

Line 37–38:

Complete separation discussion needs stronger epidemiological justification.

Methods

Issue 3

Line 50

DHS participants were not recruited through health facilities.

Must be corrected.

Issue 4

Line 53

Outcome coding:

Alive = 1

Dead = 0

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Needs explicit justification because mortality studies usually code death as 1.

Issue 5

Line 72

Lasso α = 0.5 appears arbitrary.

Need:

*** tuning process,**

*** cross-validation strategy,**

*** software commands.**

Issue 6

No missing-data strategy reported.

Need:

*** Missing percentage**

*** Imputation/exclusion approach**

Results

Issue 7

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BMI malnutrition prevalence:

67.4%

Needs definition and cutoff criteria.

Issue 8

Anaemia prevalence:

87.6%

Extremely high.

Need validation and severity classification.

Issue 9

Table 2 reports χ^2=393.15

Extremely large value.

Contingency table should be provided.

Issue 10

Mortality among diarrhoeal children:

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60.5%

Requires verification.

Multicollinearity Section

Issue 11

Table 3 classification inconsistent.

Authors label:

VIF = 8.14

as severe multicollinearity.

But stated criterion:

VIF > 10 = severe.

Should be moderate.

Regression Analysis

Issue 12

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No confidence intervals reported.

All ORs should include:

95% CI

Issue 13

No model performance statistics:

Need:

*** AUC**
*** Accuracy**
*** Sensitivity**
*** Specificity**
*** Calibration**

Issue 14

Lasso coefficient shrinkage may bias OR estimates.

This limitation is not discussed.

Discussion

Issue 15

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Diarrhoea discussion overstates causality.

Replace:

> dominant determinant

with

> strongest observed association.

Issue 16

"Intermediate literacy effect" explanation lacks direct evidence.

Requires stronger support.

Issue 17

Breastfeeding explanation is speculative.

Alternative explanations should be discussed.

Conclusion

Issue 18

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Authors state:

> Penalised logistic regression is the appropriate approach.

This is too strong.

Firth logistic regression is often preferred for rare events.

Need balanced wording.

 # 4. Scientific Significance

Originality

Moderate.

Application of penalized regression to Guinea child mortality data is relatively novel.

Public Health Importance

High.

Findings could inform maternal education and diarrhoeal disease control programs.

Methodological Contribution

Moderate.

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However, methodological execution requires substantial improvement.

Potential Impact

Good if statistical concerns are addressed.

Final Recommendation: **MAJOR REVISION**

Justification

The study addresses an important topic and uses a potentially appropriate statistical framework. However, major concerns exist regarding:

1. DHS sampling description.
2. Verification of outcome coding.
3. Implausible diarrhoea-mortality findings.
4. Lack of survey-weighted analysis.
5. Insufficient reporting of Lasso methodology.
6. Missing confidence intervals and model diagnostics.
7. Overinterpretation of causal relationships.

The manuscript has potential for publication after substantial methodological clarification, data verification, and revision of statistical interpretations.

 # Major Revision Justification (Issue and Reason Line-by-Line)

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1. Title

Lines 1–3

****Issue:** "Under2 Five Children" appears in the title.**
****Reason:** Typographical error. The correct term is "Under-Five Children" or "Children Under Five Years of Age." This affects professionalism and indexing.**

2. Abstract

Lines 9–10

****Issue:** Use of Chi-square tests and Lasso regression is mentioned, but no justification for choosing Lasso over Firth logistic regression.**
****Reason:** For rare-event data with complete separation, Firth logistic regression is generally preferred in epidemiology.**

Lines 12–14

****Issue:** Authors report that 23 of 38 children with diarrhoea died (60.5%).**
****Reason:** This mortality rate is extraordinarily high and raises concerns about coding errors or misclassification of outcome variables.**

Line 14

****Issue:** "Diarrhoea is the leading determinant of child mortality."**

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****Reason:** Cross-sectional studies identify associations, not determinants or causality.**

3. Introduction

Lines 29–30

****Issue:** Missing punctuation in:**
"Socioeconomic determinants household income, maternal education..."
****Reason:** Reduces readability.**

Lines 35–39

****Issue:** Complete separation discussion lacks sufficient methodological detail.**
****Reason:** Readers need explanation of why Lasso was selected instead of Firth logistic regression.**

Lines 41–44

****Issue:** Objectives mention quantifying effects using penalised logistic regression.**
****Reason:** No clear hypothesis framework is provided.**

4. Materials and Methods

Lines 49–51

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****Issue:** DHS data described as collected from mothers attending health facilities.**

****Reason:** DHS is a household-based survey, not a facility-based survey. This is factually incorrect.**

Line 51

****Issue:** Sample selection process not described.**

****Reason:** Inclusion and exclusion criteria are missing.**

Lines 53–54

****Issue:** Outcome coded as Alive=1 and Dead=0.**

****Reason:** Unusual coding may complicate interpretation of odds ratios.**

Lines 56–62

****Issue:** Variable definitions are incomplete.**

****Reason:** No operational definitions for:**

*** Anaemia**

*** Malnutrition**

*** Access to information**

*** Poverty index**

Lines 67–69

****Issue:** Chi-square test assumptions not discussed.**

****Reason:** Several cells may have expected counts below 5 due to only 23 deaths.**

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Lines 70–74

****Issue:** Lasso penalty parameter (α = 0.5) not justified.**

****Reason:** No cross-validation or tuning procedure reported.**

Lines 74–75

****Issue:** Statistical software reported, but code and packages are not detailed.**

****Reason:** Reproducibility is limited.**

Lines 76–78

****Issue:** VIF threshold correctly defined as >10.**

****Reason:** Later interpretation contradicts this threshold.**

Entire Methods Section

****Issue:** No handling of missing data reported.**

****Reason:** Missing values can bias estimates.**

Entire Methods Section

****Issue:** DHS sampling weights, clustering, and stratification ignored.**

****Reason:** Results may be biased and not nationally representative.**

5. Results

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Lines 82–84

****Issue:** Only 23 deaths occurred.**

****Reason:** Extremely small event count limits multivariable modeling reliability.**

Lines 87–88

****Issue:** Anaemia prevalence reported as 87.6%.**

****Reason:** Unusually high prevalence requires validation.**

Line 87

****Issue:** BMI malnutrition prevalence reported as 67.4%.**

****Reason:** BMI is not the standard nutritional indicator for under-five children.**

Table 1

****Issue:** No confidence intervals reported.**

****Reason:** Precision of estimates cannot be assessed.**

6. Chi-Square Analysis

Lines 98–100

****Issue:** 23 deaths among 38 diarrhoeal children and zero deaths among 658 non-diarrhoeal children.**

****Reason:** Highly improbable finding suggests coding or data extraction errors.**

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Line 98

****Issue:** $\chi^2 = 393.15$.**
****Reason:** Extremely large statistic requires verification.**

Lines 101–103

****Issue:** Mortality higher among primary educated mothers than uneducated mothers.**
****Reason:** Requires stratified analysis before interpretation.**

Line 103–104

****Issue:** Exclusive breastfeeding associated with mortality.**
****Reason:** Opposite to established evidence and needs deeper investigation.**

7. Multicollinearity Analysis

Lines 109–111

****Issue:** Authors state variables with VIF above 10 indicate severe multicollinearity.**
****Reason:** Correct criterion.**

Table 3

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****Issue:** Variables with VIF below 10 are labeled "Severe."**

****Reason:** Contradicts stated methodology.**

Examples:

*** Delivery in facility = 8.94**

*** Birth length = 8.14**

*** Marital status = 8.28**

These should be moderate, not severe.

8. Penalized Logistic Regression

Lines 116–119

****Issue:** Complete separation claimed.**

****Reason:** Contingency tables should be provided.**

Lines 120–123

****Issue:** OR = 0.001 interpreted as a major risk factor.**

****Reason:** Since survival is coded as 1, OR < 1 indicates reduced odds of survival, not directly increased mortality.**

Table 4

****Issue:** Confidence intervals absent.**

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****Reason:** Impossible to assess precision.**

Table 4

****Issue:** No p-values reported.**
****Reason:** Statistical significance cannot be verified.**

Table 4

****Issue:** Model fit measures absent.**
****Reason:** No evidence regarding predictive performance.**

Missing:

*** AUC**
*** ROC**
*** Accuracy**
*** Calibration**

Entire Regression Section

****Issue:** Lasso coefficient estimates interpreted as standard logistic regression coefficients.**
****Reason:** Penalization shrinks coefficients and complicates interpretation.**

9. Discussion

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Lines 131–142

****Issue:** Diarrhoea described as dominant determinant.**

****Reason:** Causal language inappropriate in a cross-sectional study.**

Lines 138–140

****Issue:** OR = 0.001 interpreted as confirming robustness.**

****Reason:** Could simply reflect separation and sparse data bias.**

Lines 150–154

****Issue:** "Intermediate literacy effect" explanation offered.**

****Reason:** No evidence from current data supports this interpretation.**

Lines 157–164

****Issue:** Reverse causality proposed for breastfeeding result.**

****Reason:** Pure speculation without supporting analyses.**

Lines 165–171

****Issue:** Limitations section incomplete.**

****Reason:** Does not mention:**

*** Lack of survey weighting**

*** Potential recall bias**

*** Measurement error**

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10. Recommendations

Lines 173–184

****Issue:** Recommendations imply causal effects.**
****Reason:** Cross-sectional data support associations only.**

Lines 186–189

****Issue:** Authors recommend Firth logistic regression.**
****Reason:** Contradicts their earlier assertion that Lasso was the preferred solution.**

11. Conclusion

Lines 202–205

****Issue:** Authors state:**
"Penalised logistic regression is the appropriate approach."
****Reason:** Overstated claim. Firth logistic regression remains the standard approach for rare-event separation problems.**

Lines 206–208

****Issue:** Policy recommendations are based on observational associations.**

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****Reason:** Causal claims are not supported by the study design.**

 # Summary of Major Revision Decision

Major Statistical Concerns

1. Possible coding error in diarrhoea and mortality variables.

2. Implausible 60.5% diarrhoea mortality rate.

3. No survey-weighted DHS analysis.

4. Inadequate description of Lasso methodology.

5. No confidence intervals or model diagnostics.

6. Incorrect interpretation of odds ratios.

Major Methodological Concerns

7. Incorrect description of DHS sampling.

8. Missing variable definitions.

9. Missing handling of missing data.

10. Contradictory multicollinearity interpretation.

Major Interpretation Concerns

11. Overuse of causal language.

12. Speculative explanations for unexpected findings.

13. Conclusions stronger than evidence supports.

Final Recommendation: **MAJOR REVISION**

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The manuscript addresses an important public health issue and has publication potential, but substantial revisions are required before the findings can be considered reliable and scientifically robust.