Maternal Self-rated Capability Status and Its Association with Under-Five Children Morbidity

Tosin Yinka Akintunde1,2, Shaojun Chen1, Elhakim Ibrahim2,3, and Angwi Enow Tassang1

Abstract

Background: Under-five morbidity is a significant public health concern in developing countries, and maternal intervention remains vital to achieving under-five optimal health. Objective: The study examined the influence of maternal self-rated capability status (SCS) on under-five morbidity in Ibadan North Local Government Area (LGA), Oyo State, Nigeria. Methods: The study interviewed 683 nursing mothers surveyed from 20 primary healthcare centers (PHCs) from 13th to 27th September 2018 in the LGA of study. We employed logistic regression models to examine the association of 4 domains of maternal SCS on under-five morbidity incidence controlling for the potential confounding effects of maternal, child, and household sociodemographic attributes. Results: Under-five children of mothers with poor status in the knowledge of child morbidity, experience-informed action, child morbidity exposure, and childcare vulnerability domains are, respectively, 497%, 323%, 400%, and 318% more likely to be at risk of morbidity than their peers born to mothers with good status. In addition, the odds of morbidity were lower for children born to women with more than 1 under-five child (AOR: 0.49, 95% CI: 0.27, 0.88), while the odds were higher for those from households that are food-insecure (AOR: 3.16, 95% CI: 1.31, 7.65) and dispose of wastes within the compound (AOR: 2.67, 95% CI: 1.31, 5.45) relative to children in the comparative categories. Conclusion: Our findings revealed the significance of maternal SCS as a crucial pathway for understanding and reducing under-five morbidity. Community interventions should prioritize empowering nursing mothers with prevention and care information necessary to reduce the under-five morbidity burden at the community level.

Keywords

self-rated capability status, childcare vulnerability, child morbidity exposure, child morbidity knowledge, under-five morbidity, Nigeria

Introduction

Under-five morbidity persists predominantly in middle and low-income countries, and Sub-Saharan Africa ranked among the countries experiencing high under-five mortality induced by high morbidity incidences.1 Nigeria has reported a significant reduction in the under-five mortality rate attributed to improved coverage of campaigns targeting child survival; however, the problem continues to exist that 1 in every 8 children dies before age 5 in Nigeria.2 The published evidence highlights the need to bolster the effort to abate under-five morbidity to the barest minimum to support healthcare practitioners3 and government efforts. Hence, numerous studies have consistently linked childhood illnesses as the leading cause of under-five morbidity.4 Existing literature has explored the nagging problem of under-five children morbidity and the associated risk factors. A significant number of under-five children’s risk factors are nutritional imbalances from malnutrition, causing underweight, stunting, and wasting, leading to morbidity.5,6

1Department of Sociology, Hohai University, Nanjing, China 2Department of Demography and Social Statistics, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria 3Department of Demography, The University of Texas at San Antonio, San Antonio, TX, USA

Corresponding Author:
Tosin Yinka Akintunde, Department of Sociology, School of Public Administration, Hohai University, 8 Focheni Lu, Jiangning, Nanjing, 211100, China.
Email: akintunde.ty@hhu.edu.cn; akintunde_olayinka@yahoo.com
Asides pneumonia morbidity affecting children globally,\textsuperscript{7} diarrhea is another contributor to under-five morbidity. Diarrhea morbidity incidences of under-five children are attributed to parents’ differential sociodemographic characteristics and households’ environmental and behavioral function.\textsuperscript{2,8} Peculiar to Nigeria, the probability of child diarrhea was higher for children with younger mothers below 35 years old.\textsuperscript{9} Despite the control and intervention method adopted for diarrhea incidences, the burden remains relatively high among children.\textsuperscript{10} Other morbidity incidences peculiar to under-five children are associated with mothers involved in teenage pregnancy,\textsuperscript{11} low birth weight,\textsuperscript{12} immunization participation,\textsuperscript{13} and acute respiratory infection.\textsuperscript{14}

The underpinning evidence falls back on maternal actions as a vital instrument in supporting various interventions to reduce under-five morbidity. In the face of governmental investments, pediatricians, primary and community healthcare workers, the maternal role is inevitable, and it requires extensive attention to understand maternal action and inactions. However, there is a paucity of scientific evidence centered on the influence of maternal self-rated capability status (SCS) on under-five morbidity. The maternal self-rated capability status reflects the personal assessment of how confident and in control mothers resolve under-five health issues. Like self-rated health (SRH) that measures health based on subjective evaluation,\textsuperscript{15} maternal SCS for under-five health presupposes that childcare rests heavily on mothers,\textsuperscript{16} and they make the best decision possible for their optimal health.

The health structure and management of disease in Nigeria cut across 3 levels of services provided by the federal, state, and local governments, each with autonomy. The local government advances health services at the primary-level by providing child and maternal care, health education, promotion, and intervention to families through primary healthcare centers (PHCs). The direct service coordinated by the local government enables mothers to easily access affordable healthcare services to reduce the burden of diseases at the household level. Based on the services provided by the PHCs, they ensure community participation in free immunization and health promotion for under-served communities for the prevention of diseases associated with children. According to the National Ministry of Health report, there are significant barriers to delivering health education, promotion, and intervention in the local governments across Nigeria.\textsuperscript{17} Bulk of the intervention and health promotion services rendered at the local governments are supported by UNICEF and Save the Children. However, there has been ongoing action to reduce child morbidity through Diagnose-Intervention-Verify-Adjust (DIVA),\textsuperscript{18,19} the Integrated Management of Childhood Illness (IMCI) programs, Integration Maternal Newborn and Child Health Strategy, and revitalization of primary healthcare centers.\textsuperscript{20} Other infection specific project is the National Malaria Strategic Plan coordinated by the Federal Ministry of Health.\textsuperscript{21} However, these services’ efficacy requires further investigation to ascertain coverage and achievement toward improving under-five health.

The concept of maternal SCS for under-five morbidity is a subjective approach to addressing mothers’ level of control concerning under-five health. While there are challenges in managing the under-five morbidity,\textsuperscript{22} assessing mothers’ instinctive measures to safeguard under-five health may be pivotal in eradicating morbidity in Nigeria and other regions with similar demographics and social structure. Maternal SCS indices purported mothers’ level of commitment to ensure that under-five children are not morbidly at risk. By investigating maternal SCS toward under-five morbidity in Nigeria, presents a significant insight into maternal self-confidence and may help reengineer future morbidity prevention framework for under-five children. Thus, investigating maternal SCS may offer a trajectory for healthcare reformation and provide primary healthcare workers in Nigeria templates in educating mothers on the crucial measure to protect under-five from morbidity.

“Self-rated” assessment as an indicator has been explored in diverse contexts and domains. Although most empirical studies focus on SRH, many studies have employed self-rated assessment to measure behavioral factors and outcomes. In an empirical study among birth attendants in Nigeria, birth attendants’ self-rated confidence has been adopted to examine maternal and newborn interventions’ performance.\textsuperscript{23} In a different setting, self-rated food security was explored as a health indicator.\textsuperscript{24,25} Similarly, self-rated poverty status reflected households’ willingness to utilize free insecticide mosquito nettings as part of malaria morbidity intervention.\textsuperscript{26} In general, other empirical studies have adapted “self-rated” in the context of self-rated quality of care among clinicians,\textsuperscript{27} and self-rated poverty status of households.\textsuperscript{28} Although self-rated assessment is a subjective evaluation, its efficacy as an indicator has shown consistency in understanding behavioral patterns, social, and health concerns.

In scope, the study aims to investigate the influence of maternal self-rated capability status (SCS) on morbidity incidence among under-five children in Ibadan North Local Government Area (LGA) of Oyo State, south-west of Nigeria. Given the multilayered factors associated with under-five morbidity, we further examined the confounding effects of sociodemographic characteristics of the mothers, children, and households on the SCS-child morbidity relations hypothesized. The study will add to scientific evidence of maternal self-rated capability status on under-five morbidity outcomes toward achieving sustainable development goals in regions plagued with a high prevalence of under-five morbidity. Therefore, this study aims to examine the influence of maternal self-rated capability status (SCS) on under-five morbidity.
Methods

Study design, Population, and Data Collection

A community-based study was conducted to investigate the maternal SCS associated with under-five morbidity in Ibadan North LGA, Oyo State, Nigeria. The study setting, Ibadan, is the capital city of Oyo State, located in the southwestern region of Nigeria. Oyo State has more than 6 million dwellers with more than half of Ibadan residents, including migrants from different ethnic groups in Nigeria. Although the urbanization growth process of Ibadan city has been moderate, the nearness to the megacity of Lagos gave the city historical recognition and industrial vibrancy in Nigeria. Among all the 11 LGAs in Ibadan, we selected Ibadan North being the centrally-located LGA in Ibadan.

Data collection. Data were collected between 13th to 27th September 2018 from nursing mothers in clusters of PHCs within the LGA’s administrative territories using a convenience sampling approach. In the current study, we recruited nursing mothers through convenience based on past experiences and accessibility in these communities. While the recruitment method yielded a considerable number of respondents, they are nonrepresentative and subject to bias. The respondents’ recruitment was facilitated with the support of PHC workers and experience research enumerators. We recruited mothers who visited the PHCs for wellness and immunization visits. During these visits especially scheduled immunization visits in the PHCs, mothers were recruited for voluntary participation. Although other studies have adopted this approach in Ibadan, we covered 20 PHCs in the local government. In all, 700 respondents were interviewed. However, only 683 have complete information necessary for analysis in this study.

Inclusion and exclusion. The research respondents of this study were mainly biological mothers. All caregivers and non-biological mothers were excluded from participating in the survey, given the research focus. Meanwhile, data analysis was based on the youngest child of respective mothers, and there were no twin children represented in this study.

Ethical consideration. Ethical approval was granted by the Department of Planning, Research, and Statistics Division, Ministry of Health, Oyo State, Nigeria (Ref No.: AD13/479/859). Approval was also received from various heads of each PHC, and informed consent was obtained directly from the research participants. The research participants were informed of the voluntary nature of participation and were asked to respond to the research questionnaire’s consent question.

Measures

Predictors. This study employed 4 key independent variables to evaluate maternal SCS as it relates to under-five morbidity, vulnerability, prevention or care attitudes, and behaviors after an extensive review of the literature. We consider 4 SCS dimensions: child morbidity knowledge, experience-informed action, child morbidity exposure, and child care vulnerability. The SCS was derived via five-point Likert scale responses (comprising 5. Strongly agree, 4. Agree, 3. Undecided, 2. Disagree, and 1. Strongly disagree) to 4 separate questionnaire items with internal reliability Cronbach’s alpha of .72. In line with the study assumption and for intuitive reporting, we reclassified the responses as “good” (for “strongly agree” and “agree” responses) and “poor” (for “undecided,” “disagree,” and “strongly disagree” responses) capability in child morbidity knowledge and experience-informed action domains. For SCS in Child morbidity exposure and Childcare vulnerability “good” (for “strongly disagree” and “disagree” responses) and “poor” (for “undecided,” “agree,” and “strongly agree” responses) (Table 1, Panel A). We hypothesized that “good” SCS would be associated with lower morbidity incidence for the respondents’ youngest children than “poor” SCS.

Outcome. The outcome of interest focus on recent episodes of morbidity among the youngest children of the respondents. Given the small scale of the survey, recent morbidity episodes were measured based on the mother’s report of any common disease (eg, cough/cold, acute respiratory infection, malaria, and measles) among the focused children group 30 days before the interview. The child health questionnaire (CHQ) was extracted from the phase 8 core questionnaire of the Demographic and Health Surveys program, regarded as a source of maternal and child health information in developing countries. All reported cases of recent morbidity were assigned codes 1 and 0 otherwise to generate descriptive binary outcome “Yes” and “No” for the mother’s report of recent under-five morbidity episodes and no report.

Confounders. We examined several sociodemographic characteristics of the mother, child, and household in the analysis based on existing literature. Mother-specific factors included are age, marital status, number of children under-five, child death experience, education (the number of years corresponding to each level of education), and employment status, whereas the child-specific attributes comprised age, sex, prior immunization status, and use of insecticide-treated net (ITN). Meanwhile, at the household level, the characteristics included were household size, wealth status, food security, water source, toilet type, waste disposal, and type of cooking fuel (Table 1, Panel B). Household wealth status was generated using principal component analysis (household wall, electricity connection, television, refrigerator, cable connection, power generating set, pressing iron, fan, bank account) mean value as the cut-off point.
To achieve the objectives of this study, both descriptive and analytical procedures were employed. The descriptive component comprised percentage distribution and pictorial representation of the population characteristics and dynamics of recent morbidity incidence among respondents. For the analysis, we fitted both unadjusted and adjusted logistic regression models. In all, 6 models were derived. Models 1 to 4 were unadjusted models fitted to examine each of the SCS variables’ unconditional influence on morbidity reports among respondents’ most recent births. While in Model 5, the 4 SCS variables were jointly included, Model 6 added the mother, child, and household’s sociodemographic characteristics to Model 5 intended to isolate the net effects of the mother’s SCS on morbidity occurrence among under-five children. In building these models, we assumed that, collectively, the mother, child, and household’s sociodemographic characteristics would have a considerably confounding effect on the association between SCS and the outcome. The logistic models’ results were reported as odds ratios (and confidence intervals), whereby values above/below 1 is a comparative category of a specific attribute indicate higher/lower likelihood of the outcome relative to the assigned reference category of the attribute. We evaluated statistical significance using \( P \leq .05 \) (ie, at 95% level of significance). The analysis was conducted using R statistical computing software.

Results

The distributions of the 683 participants and patterns of recent morbidity incidence according to the measured characteristics are shown in Table 2, Figures 1 and 2. Table 2 shows that participants aged 25 to 35 years, in a union, attained secondary education and were employed.
constituted the majority of the participants. However, Figure 1 shows the distribution of respondents by their SCS across the 4 domains of child health response, while Figure 2 depicts the distribution of recent child morbidity episodes by the respondents’ SCS in the 4 domains of child health response being evaluated. In aggregate, the majority of the participants were found to concentrate in the “good” capability category for child health management in all domains except for the “experience-informed action,” in which two-thirds of the participants belong to the “poor” capability category (Figure 1).

We assessed recent disease incidence among children by categories in mother’s SCS (Figure 2) and background attributes with the distribution in each row summing up to 100 (Table 2). Overall, about one-fifth (20.8%) of the respondents reported incidences of morbidity for their youngest child within the last 30 days before the interview. Meanwhile, the proportions of reported morbidity cases were generally lower for participants with good capability across the 4 domains of child health response considered (Figure 2). Remarkably, however, the highest proportions of morbidity incidence in both the good and poor capability categories

### Table 2. Distributions of the Study Respondents and Recent Under-Five Morbidity Incidence.

| Variables Categories | Sample | Recent morbidity incidence |
|----------------------|--------|----------------------------|
|                      | N (Col %) | No (Row %) | Yes (Row %) |
| Age 35-49            | 105 (15.4) | 88 (83.8) | 17 (16.2) |
| Age 25-34            | 470 (68.8) | 369 (78.5) | 101 (21.5) |
| Age 15-24            | 108 (15.8) | 84 (77.8) | 24 (22.2) |
| Marital status In union | 614 (89.9) | 491 (80.0) | 123 (20.0) |
| Marital status Not in union | 69 (10.1) | 50 (72.5) | 19 (27.5) |
| Children under-five 1 | 540 (79.1) | 421 (78.0) | 119 (22.0) |
| Children under-five 2+ | 143 (20.9) | 120 (83.9) | 23 (16.1) |
| Experienced child death No | 641 (93.9) | 515 (80.3) | 126 (19.7) |
| Experienced child death Yes | 42 (6.1) | 26 (61.9) | 16 (38.1) |
| Education Tertiary | 265 (38.8) | 205 (77.4) | 60 (22.6) |
| Education Secondary | 339 (49.6) | 275 (81.1) | 64 (18.9) |
| Education Primary/None | 79 (11.6) | 61 (77.2) | 18 (22.8) |
| Employment status Employed | 520 (76.1) | 419 (80.6) | 101 (19.4) |
| Employment status Unemployed | 163 (23.9) | 122 (74.8) | 41 (25.2) |
| Child’s age ≥1-year old | 389 (57.0) | 306 (78.7) | 83 (21.3) |
| Child’s age <1-year old | 294 (43.0) | 235 (80.1) | 59 (20.1) |
| Sex of child Male | 362 (53.0) | 283 (78.2) | 79 (21.8) |
| Sex of child Female | 321 (47.0) | 258 (80.4) | 63 (19.6) |
| Immunization status Complete | 592 (86.7) | 465 (78.5) | 127 (21.5) |
| Immunization status Incomplete | 91 (13.3) | 76 (83.5) | 15 (16.5) |
| Slept under ITN No | 349 (51.1) | 271 (77.7) | 78 (22.3) |
| Slept under ITN Yes | 334 (48.9) | 270 (80.8) | 64 (19.2) |
| Household size 5+ members | 408 (59.7) | 319 (78.2) | 89 (21.8) |
| Household size <5 members | 275 (40.3) | 220 (80.7) | 53 (19.3) |
| Household wealth status ≤Average | 452 (66.2) | 365 (80.8) | 87 (19.2) |
| Household wealth status >Average | 231 (33.8) | 176 (76.2) | 55 (23.8) |
| Household food security Secure | 651 (95.3) | 521 (80.0) | 130 (20.0) |
| Household food security Insecure | 32 (4.7) | 20 (62.5) | 12 (37.5) |
| Household water source Piped/borehole | 371 (54.3) | 286 (77.1) | 85 (22.9) |
| Household water source Rainwater/others | 312 (45.7) | 255 (81.7) | 57 (18.3) |
| Household toilet type Flush/septic tank | 611 (89.5) | 491 (80.4) | 120 (19.6) |
| Household toilet type Pit/other | 72 (10.5) | 50 (69.4) | 22 (30.6) |
| Household waste disposal Outside compound | 628 (91.9) | 508 (80.9) | 120 (19.1) |
| Household waste disposal Within compound | 55 (8.1) | 33 (60.0) | 22 (40.0) |
| Household cooking fuel type Gas | 488 (71.4) | 397 (81.4) | 91 (18.6) |
| Household cooking fuel type Kerosene/others | 195 (28.6) | 144 (73.8) | 51 (26.2) |
were found in the “child morbidity exposure” domain (14.9% and 41.2%).

Table 3 shows the logistic regression estimates of the relationship between maternal SCS and under-five morbidity. Models 1 to 4 explore the unadjusted odds ratios (UOR) of the effects of each of the 4 SCS measures on the outcome. The outcome in Models 1 to 4 shows that compared with children of mothers with good capability, those mothers with poor SCS in the domains of child morbidity knowledge, experience-informed action, child morbidity exposure, and childcare vulnerability, respectively, were 497%, 323%, 400%, and 318% significantly more likely to be reported morbid during the 4 weeks preceding the survey \((P < .01)\). All the 4 SCS variables were jointly considered in Model 5 to examine their independent influence on child morbidity while holding the other 3 dimensions constant. The partial adjustment has significantly modifying effects on the relative odds of morbidity with considerable
Table 3. Logistic Regression Odds Ratios of Under-Five Morbidity Incidence Associated with Maternal Self-Rated Capability Status, Adjusted for Maternal, Child, and Household’s Sociodemographic Characteristics; Ibadan North LGA, Oyo State, Nigeria.

| Variables                                | Categories          | Models 1-4 UOR (95% CI) | Model 5 AOR (95% CI) | Model 6 AOR (95% CI) |
|------------------------------------------|---------------------|-------------------------|----------------------|----------------------|
| Child morbidity knowledge SCS            | Good                | 1                       | 1                    | 1                    |
|                                         | Poor                | 4.97 (3.27, 7.56)**     | 2.67 (1.53, 4.65)**  | 3.05 (1.66, 5.60)**  |
| Experience-informed action SCS           | Good                | 1                       | 1                    | 1                    |
|                                         | Poor                | 3.23 (2.00, 5.22)**     | 1.40 (0.80, 2.44)    | 1.86 (0.99, 3.48)    |
| Child morbidity exposure SCS             | Good                | 1                       | 1                    | 1                    |
|                                         | Poor                | 4.00 (2.68, 5.97)**     | 1.78 (1.11, 2.85)*   | 1.80 (1.02, 3.17)*   |
| Childcare vulnerability SCS              | Good                | 1                       | 1                    | 1                    |
|                                         | Poor                | 3.18 (2.17, 4.66)**     | 1.48 (0.94, 2.32)    | 1.71 (1.02, 2.87)*   |
| Age                                      | 35-49               |                         | 1.30 (0.67, 2.54)    | 0.92 (0.38, 2.25)    |
|                                         | 25-34               |                         |                      |                      |
|                                         | 15-24               |                         |                      |                      |
| Marital status                           | In union            | 1                       | 1                    | 1                    |
|                                         | Not in union        |                         |                      |                      |
| Children under-five                      | 1                   | 0.78 (0.40, 1.50)       |                      |                      |
|                                         | 2+                  | 0.49 (0.27, 0.88)*      |                      |                      |
| Experienced child death                  | No                  | 1                       | 1                    | 1                    |
|                                         | Yes                 | 1.49 (0.71, 3.16)       |                      |                      |
| Education                                | Tertiary            | 0.75 (0.43, 1.30)       |                      |                      |
|                                         | Secondary           | 0.92 (0.42, 2.03)       |                      |                      |
|                                         | Primary/none        |                         |                      |                      |
| Employment status                        | Employed            | 1                       | 1                    | 1                    |
|                                         | Unemployed          | 0.88 (0.53, 1.45)       |                      |                      |
| Child's age                              | ≥1-year old         | 1                       | 1                    | 1                    |
|                                         | <1-year old         | 0.95 (0.58, 1.53)       |                      |                      |
| Sex of child                             | Male                | 1                       | 1                    | 1                    |
|                                         | Female              | 0.92 (0.60, 1.40)       |                      |                      |
| Immunization status                      | Complete            | 0.66 (0.34, 1.28)       |                      |                      |
|                                         | Incomplete          |                         |                      |                      |
| Slept under ITN                          | No                  | 0.65 (0.40, 1.05)       |                      |                      |
|                                         | Yes                 | 0.65 (0.40, 1.05)       |                      |                      |
| Household size                           | 5+ members          | 0.89 (0.56, 1.42)       |                      |                      |
|                                         | <5 members          |                         |                      |                      |
| Household wealth status                  | ≤Average            | 1.07 (0.59, 1.96)       |                      |                      |
|                                         | >Average            |                         |                      |                      |
| Household food security                  | Secure              | 3.16 (1.31, 7.65)*      |                      |                      |
|                                         | Insecure            | 0.79 (0.41, 1.55)       |                      |                      |
| Household water source                   | Piped/borehole      | 1.28 (0.81, 2.01)       |                      |                      |
|                                         | Rainwater/others    |                         |                      |                      |
| Household toilet type                    | Flush/septic tank   | 1.29 (0.61, 2.70)       |                      |                      |
|                                         | Pit/others          |                         |                      |                      |
| Household waste disposal                 | Outside compound    | 2.67 (1.31, 5.45)**     |                      |                      |
|                                         | Within compound     |                         |                      |                      |
| Household cooking fuel type              | Gas                 | 0.79 (0.41, 1.55)       |                      |                      |
|                                         | Kerosene/others     |                         |                      |                      |

Abbreviations: UOR, unadjusted odds ratios; AOR, adjusted odds ratios; 95% CI, 95% confidence intervals; (ref.), reference category.

Models 1: Unadjusted effect of child morbidity knowledge SCS on the outcome;
Model 2: Unadjusted effect of experience-informed action SCS on the outcome;
Model 3: Unadjusted effect of child morbidity exposure SCS on the outcome;
Model 4: Unadjusted effect of childcare vulnerability SCS on the outcome;
Model 5: Simultaneous adjustment for SCS variables in Models 1 to 4;
Model 6: The full model; adjusted Model 5 for mother, child, and household’s sociodemographic characteristics.

*P < .05. **P < .01.
reductions in the higher likelihoods of morbidity among children born to mothers with poor SCS relative to those mothers with good SCS and loss of significance in experienced-informed action and childcare vulnerability domains, respectively. Meanwhile, in the full model (Model 6), upward changes in greater odds of morbidity across poor SCS categories as compared with good SCS were observed in the 4 domains (even though the experienced-informed action maintained no significance) when mother, child, and household sociodemographic variables were introduced in the full model (Model 6). The results suggest that the whole model offered a robust explanation of the association between maternal SCS and child morbidity among the interviewed participants.

Additionally, the odds of child morbidity were lower for women with more than 1 under-five children (AOR: 0.49, 95% CI: 0.27, 0.88). However, the results also indicated that children from households that are food insecure (AOR: 3.16, 95% CI: 1.31, 7.65) and in which wastes are disposed-off within the compound (AOR: 2.67, 95% CI: 1.31, 5.45) are more susceptible to morbidity relative to their peers from food secure households and in which wastes are deposited outside the compound.

Discussion

This study’s primary objective was to establish the strength of maternal self-rated capability status in association with under-five morbidity. Although this study is the first to adopt this research approach, the outcome elucidates the importance of maternal SCS in explaining under-five morbidity experience in the community investigated. Building on the analytical result, we established that under-five children of mothers with poor SCS were significantly at risk of morbidity than mothers with good SCS. Similarly, key household characteristics provided insightful findings in examining under-five morbidity incidences.

The domain accessing maternal self-rated capability status on knowledge of under-five morbidity shows that under-five children of mothers with poor SCS in this category have a 497% chance of morbidity. The maternal knowledge of under-five morbidity has been in empirical discourse as a crucial mediator in abating under-five morbidity.31,39 Mothers making it a responsibility to learn about all forms of childhood illnesses and diseases are positioned to identify symptoms early and seek necessary medical help for their under-five child. Poor maternal self-rated knowledge of under-five morbidity means there is a dearth of information required to take health actions that may further affect other areas of maternal child practice, healthcare choice, and the timeliness of seeking medical attention. Although many diseases cause under-five morbidity, children of mothers with substantial knowledge of under-five diseases are less vulnerable to morbidity.

Evidence from the research finding shows that the number of under-five children under maternal care significantly determines the risk of under-five morbidity. Inadequate maternal self-rated experience status based on older children’s exposure to diseases may have shown that under-five children are morbidly at risk; it also suggested that other factors may be responsible for morbidity exposure. For example, a first-time mother may lack past under-five morbidity experiences and subsequently result in low self-rated informed experience. Having raised an under-five child previously will improve mothers’ expertise toward making the best decision to reduce morbidity. However, this assertion does not favor first-time mothers. Maternal self-rated experience status, if adequate, minimizes the risk of morbidity for under-five children in a triple fold.

A mother’s belief about an under-five child’s exposure to disease accesses the relationship of SCS of child vulnerability on morbidity. Although mothers’ beliefs about child exposure may appear to be dynamic from a cultural and religious perspective, belief and culture are critical under-five health indicators in sub-Saharan Africa. According to an investigation accessing the delay in seeking medical attention for under-five children in South-Eastern Nigeria, belief and culture were responsible for impeding medical treatment.22 However, based on the premise of the current research, the methodological approach identified mothers who disagreed on a question relating to high risk of under-five morbidity vulnerability as good SCS since higher perceived child vulnerability is profound among parents of unhealthy children.40

We found that under-five children of mothers with good SCS of child exposure to morbidity were 400% less likely to experience morbidity. In contrast, under-five children of mothers who agreed to child vulnerability experienced more morbidity, which supports the proof that maternal perceived child vulnerability increases parents’ report of child morbidity and hospital visits.41

The independent model assessing maternal SCS on their childcare vulnerability shows that under-five children of mothers who reported vulnerability toward childcare are 3 times more morbidly at risk. The childcare vulnerability measured in the context of maternal helplessness when dealing with under-five morbidity portrays mothers as powerless or incapable in dealing with the health situation. Having earlier indicated that women have autonomy as the caretaker of children in the family, they are expected to be in control and assertive in handling child health. However, women who lack control and helpless are more likely to have children who experience morbidity.42 In support of this evidence, mothers faced with a morbid child undergo hysteria, emotional distress, and subsequently become helpless seeing the child’s deteriorating condition.43

In aggregation, the findings across all maternal SCS on under-five morbidity show that under-five children experience more morbidity when mothers have low self-rated
capabilities on knowledge of child morbidity and child morbidity exposure. The interaction across these domains shows the strength of having adequate capabilities to safeguard under-five against morbidity. Although the variable responsible for measuring maternal SCS on experienced-informed action and childcare vulnerability was not statistically significant in Model 5, there was an apparent reduction in morbidity among under-five children.

Finally, the maternal, child, and household sociodemographic variables in conjunction with maternal self-rated capability status were important for under-five morbidity exposure. Judging by the result of maternal self-rated capability status influence on under-five morbidity, the number of under-five children under each mother’s care, waste disposal approach, and food security were consequential to under-five morbidity. We argue that the number of under-five children under the care of a mother may significantly improve childcare knowledge and subsequently reduce the risk of morbidity. However, contrary to our findings where an under-five child of a mother with 1 child was morbidly at risk, other studies have established that the number of biological children born by a mother may be a risk factor for child survival. While mothers show the capacity to protect their under-five from morbidity, their choices and actions are equally crucial. The poor hygiene practices corroborate these maternal inadequacies and food insecurity in the communities under investigation, where other studies have established that under-five children at risk of morbidity are food insecure, and household practice are unhygienic. In advancing maternal SCS to reduce under-five morbidity, the failure to implement hygienic practices and ensure food safety, the consequential result is seen in under-five morbidity.

Overall, the present study’s policy and research implication underscore the need to improve maternal self-rated capability status. Achieving improvement rests heavily on the current maternal and child health programs obtainable in Nigeria and the community in focus. As the primary healthcare system is family-oriented, primary healthcare workers should reeducate mothers throughout prenatal, childbirth, and postnatal visitation. Some of the key focal points for mothers’ re-education should be pivoted at disease and symptom identification. Identifying symptoms and diseases peculiar to under-five children would help mothers channel their actions toward making the right decision. Also, for more precision, since the coverage of government child morbidity intervention programs is scanty in the local government, further research is advised to ascertain the progress. Besides, government programs at the community level should provide information to mothers necessary for safeguarding against under-five morbidity. This information should be freely available with extensive coverage of the communities. The government should consider embarking on a nationwide review of under-five health programs in the primary healthcare centers to evaluate performance and limitations to facilitate under-five health reformation in the local communities.

There are considerable limitations in this study. While this research exemplifies the effect of maternal self-rated capability status on under-five morbidity, care must be taken when generalizing the findings. First, the methodological limitations based on the convenience sampling approach should be considered when interpreting the research result. Although we validated the construct of maternal self-rated capability status and were able to adjudicate the direction of under-five morbidity, they were self-constructed by the authors. Therefore, we encourage that this approach is replicated in different settings to provide robust empirical evidence. Lastly, the analysis did not include maternal and child nutritional status, which are vital indicators of health. Future studies should entail these 2 variables.

Conclusion

Our findings revealed the significance of maternal self-rated capability status as a critical pathway for understanding and reducing under-five morbidity. Community interventions should prioritize empowering nursing mothers with prevention and care information necessary to mitigate the community level’s under-five morbidity burden.

Acknowledgment

The authors appreciate the support of Mr. Idowu Mashopa, Office of the Head of Service, Oyo State Government for his seamless contribution to the completion of this research.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Tosin Yinka Akintunde https://orcid.org/0000-0002-9392-8726

References

1. WHO. Children: reducing mortality. Published 2019. Accessed August 6, 2020. https://www.who.int/news-room/fact-sheets/detail/children-reducing-mortality
2. NPC. Nigeria Demographic Health Survey. Nigeria Population Council; 2019. https://www.dhsprogram.com/pubs/pdf/FR359/FR359.pdf
3. Ezeonwu B, Chima O, Oguoru T, Ikefuna A, Nwafor I. Morbidity and mortality pattern of childhood illnesses seen at the children emergency unit of federal medical center, Asaba, Nigeria. Ann Med Health Sci Res. 2014;4:239. doi:10.4103/2141-9248.141966
4. Adepoju AA, Allen S. Malnutrition in developing countries: nutrition disorders, a leading cause of ill health in the world today. *Paediatr Child Health*. 2019;29:394-400. doi:10.1016/j.paed.2019.06.005

5. Tekile AK, Woya AA, Basha GW. Prevalence of malnutrition and associated factors among under-five children in Ethiopia: evidence from the 2016 Ethiopia Demographic and Health Survey. *BMCR Notes*. 2019;12:391. doi:10.1186/s13104-019-4444-4

6. Yisak H, Gobena T, Mesfin F. Prevalence and risk factors for under nutrition among children under five at Haramaya district, Eastern Ethiopia. *BMCR Pediatr*. 2015;15:212.

7. Liu L, Oza S, Hogan D, et al. Global, regional, and national causes of under-5 mortality in 2000–15: an updated systematic analysis with implications for the Sustainable Development Goals. *Lancet*. 2016;388:3027-3035. doi:10.1016/S0140-6736(16)31593-8

8. Woldu W, Bitew BD, Gizaw Z. Socioeconomic factors associated with diarrheal diseases among under-five children of the nomadic population in northeast Ethiopia. *Trop Med Health*. 2016;44:40.

9. Berde AS, Yalçın SS, Özece H, Üner S, Karadag-Caman Ö. Determinants of childhood diarrhea among under-five year old children in Nigeria: a population-based study using the 2013 demographic and health survey data. *Turk J Pediatr*. 2018;60:353. doi:10.24953/turkjped.2018.04.001

10. Lakshminarayan J, Jayalakshmy R. Diarrheal diseases among children in India: current scenario and future perspectives. *J Nat Sci Biol Med*. 2015;6:24-28. doi:10.4103/0976-9668.149073

11. González-Andrade F, Saeteros-Cordero X. Pregnancy in adolescence and adverse neonatal outcomes in Northeastern mestizo newborns. *Pediatr Neonatol*. 2020;61:216-223. doi:10.1016/j.pedneo.2019.11.004

12. Rahman MS, Howlader T, Murad MS, Rahman ML. Association of low-birth weight with malnutrition in children under five years in Bangladesh: do mother’s education, socio-economic status, and birth interval matter? *Islam FMA*, ed. *PLoS One*. 2016;11:e0157814. doi:10.1371/journal.pone.0157814

13. Nirmolia N, Mahanta TG, Boruah M, Rasaily R, Kotoky RP, Bor A. Prevalence and risk factors of pneumonia in under five children living in slums of Dibrugarh town. *Clin Epidemiol Glob Health*. 2018;6:1-4. doi:10.1016/j.cegh.2017.07.004

14. Shi T, Balseells E, Wastnedge E, et al. Risk factors for respiratory syncytial virus associated with acute lower respiratory infection in children under five years: systematic review and meta-analysis. *J Glob Health*. 2015;5:020416. doi:10.7189/jogh.05.020416

15. Bombak AE. Self-rated health and public health: a critical perspective. *Front Public Health*. 2013;1:15. doi:10.3389/fpubh.2013.00015

16. Martin FS, Zulaika G. Who cares for children? A descriptive study of care-related data available through global household surveys and how these could be better mined to inform policy and services to strengthen family care. *Glob Soc Welf*. 2016;3:51-74.

17. Federal Ministry of Health. Saving newborn lives in Nigeria: newborn health in the context of the integrated maternal, newborn and child health strategy. Published online May 31, 2011. doi:10.1163/2210-7975_HRD-9831-0006

18. Eboreime EA, Nxumalo N, Ramaswamy R, Eyles J. Strengthening decentralized primary healthcare planning in Nigeria using a quality improvement model: how contexts and actors affect implementation. *Health Policy Plan*. 2018;33:715-728. doi:10.1093/healpol/cey042

19. Eboreime EA, Nxumalo N, Ramaswamy R, Ibisomi L, Ihebuzor N, Eyles J. Effectiveness of the Diagnose-Intervene-Verify-Adjust (DIVA) model for integrated primary healthcare planning and performance improvement: an embedded mixed methods evaluation in Kaduna state, Nigeria. *BMJ Open*. 2019;9:e026016. doi:10.1136/bmjopen-2018-026016

20. WHO. Integrated management of childhood illness: global survey report. 2017. Accessed January 11, 2021. https://www.who.int/maternal_child_adolescent/documents/imici-global-survey-report/en/

21. Federal Ministry of Health. National Malaria strategic plan 2014-2020. 2013. Accessed January 12, 2021. https://www.health.gov.ng/doc/NMEP-Strategic-Plan.pdf

22. Chukwuocha UM, Okpanma AC, Nwakwuo GC, Dozie INS. Determinants of delay in seeking malaria treatment for children under-five years in parts of South Eastern Nigeria. *J Community Health*. 2014;39:1171-1178.

23. Esan O. The knowledge versus self-rated confidence of facility birth attendants with respect to maternal and newborn health skills: the experience of Nigerian primary healthcare facilities. *Malawi Med J*. 2019;31:212-220. doi:10.4314/mmj.v31i3.8

24. Chowdhury AS, Islam QS, Ahmed SM. Current status of maternal and child health indicators in BRAC EHC Programme areas of Bangladesh. Published online 2013:33. http://dspace.bracu.ac.bd/xmlui/handle/10361/13175

25. Mark TE, Latulipe RJ, Anto-Ocrah M, Mongoti G, Adler D, Lanning JW. Seasonality, food insecurity, and clinical depression in post-partum women in a rural Malawi setting. *Matern Child Health J*. Published online November 24, 2020. doi:10.1007/s10995-020-03045-8

26. Ahmed SM, Hossain S, Kabir MM, Roy S. Free distribution of insecticidal bed nets improves possession and preferential use by households and is equitable: findings from two cross-sectional surveys in thirteen malaria endemic districts of Bangladesh. *Malar J*. 2011;10:357. doi:10.1186/1475-2875-10-357

27. Klein J, Grosse Frie K, Blum K, von dem Knesebeck O. Burnout and perceived quality of care among German clinicians in surgery. *Int J Qual Health Care*. 2010;22:525-530. doi:10.1093/intqhc/mzq056

28. Ahmed SM, Zerihun A. Possession and usage of insecticidal bed nets among the people of Uganda: is BRAC Uganda health programme pursuing a pro-poor path? Noor AM, ed. *PLoS One*. 2010;5:e12660. doi:10.1371/journal.pone.0012660

29. Ivan B. Planning a city for today, tomorrow and the future: Ibadan, Nigeria. Published 2019. Accessed January 11, 2021. https://blogs.worldbank.org/africacan/planning-city-today-tomorrow-and-future-ibadan-nigeria

30. Oluwatosin OA. Comparative study and determinants of infection control practices of mothers of under-five children
in selected health care institutions in Ibadan. *Int J Infect Control*. 2014;10. doi:10.3396/ijic.v10i4.13210

31. Merga N, Alemayehu T. Knowledge, perception, and management skills of mothers with under-five children about diarrhoeal disease in indigenous and resettlement communities in Assosa District, Western Ethiopia. *J Health Popul Nutr*. 2015;33:20-30.

32. Mitchell AE, Morawska A, Mihelic M. A systematic review of parenting interventions for child chronic health conditions. *J Child Health Care*. 2020;24:603-628. doi:10.1177/1367493519882850

33. Farkas C, Valdés N. Maternal stress and perceptions of self-efficacy in socioeconomically disadvantaged mothers: an explicative model. *Infant Behav Dev*. 2010;33:654-662. doi:10.1016/j.infbeh.2010.09.001

34. Kim J, Park H-A. Development of a health information technology acceptance model using consumers’ health behavior intention. *J Med Internet Res*. 2012;14:e133. doi:10.2196/jmir.2143

35. Bryan AD, Aiken LS, West SG. Young women’s condom use: the influence of acceptance of sexuality, control over the sexual encounter, and perceived susceptibility to common STDs. *Health Psychol*. 1997;16:468-479.

36. DHS Program. DHS Model Questionnaire - Phase 8 (English, French). Accessed February 11, 2021. https://dhsprogram.com/publications/publication-dhsq8-dhs-questionnaires-and-manuals.cfm

37. Adedokun ST. Correlates of childhood morbidity in Nigeria: evidence from ordinal analysis of cross-sectional data. *PLoS One*. 2020;15:e0233259. doi:10.1371/journal.pone.0233259

38. R Core Team. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing; 2020.

39. Oyekale AS. Assessment of Malawian mothers’ malaria knowledge, healthcare preferences and timeliness of seeking fever treatments for children under five. *Int J Environ Res Public Health*. 2015;12:521-540. doi:10.3390/ijerph120100521

40. Jantien Vrijmoet-Wiersma CM, Ottenkamp J, van Roozendaal M, Grothenhuis MA, Koopman HM. A multicentric study of disease-related stress, and perceived vulnerability, in parents of children with congenital cardiac disease. *Cardiol Young*. 2009;19:608-614. doi:10.1017/S1047951109991831

41. Tluczek A, McKeehnie AC, Brown RL. Factors associated with parental perception of child vulnerability 12 months after abnormal newborn screening results: perceived child vulnerability after newborn screening. *Res Nurs Health*. 2011;34:389-400. doi:10.1002/nur.20452

42. Carlson GJ, Kordas K, Murray-Kolb LE. Associations between women’s autonomy and child nutritional status: a review of the literature: women’s autonomy and child nutrition. *Matern Child Nutr*. 2015;11:452-482. doi:10.1111/mcn.12113

43. Haithar S, Kuria MW, Sheikh A, Kumar M, Vander Stoop A. Maternal depression and child severe acute malnutrition: a case-control study from Kenya. *BMC Pediatr*. 2018;18:289. doi:10.1186/s12887-018-1261-1

44. Liwin LK, Houle B. The effects of household and community context on mortality among children under five in Sierra Leone: evidence from the 2013 Demographic and Health Survey. *Demogr Res*. 2019;40:279-306. doi:10.4054/DemRes.2019.40.11

45. Ayana AB, Hailemariam TW, Melke AS. Determinants of acute malnutrition among children aged 6–59 months in public hospitals, Oromia region, West Ethiopia: a case–control study. *BMC Nutr*. 2015;1:34. doi:10.1186/s40795-015-0031-9

46. Zeray, A. Prevalence and associated factors of undernutrition among under-five children from model and non-model households in east Gojam zone, Northwest Ethiopia: a comparative cross-sectional study. *BMC Nutr*. 2019. doi:10.1186/s40795-019-0290-y

47. Vilcins D, Sly PD, Jagals P. Environmental risk factors associated with child stunting: a systematic review of the literature. *Ann Glob Health*. 2018;84:551. doi:10.29024/aogh.2361