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**Women's Household Decision-Making Authority and Dietary
Diversity in Nigeria**

Evidence from the 2023/24 Nigeria Demographic and Health Survey

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Abstract

Women in Nigeria face severe and persistent nutritional disadvantages rooted in patriarchal household structures that restrict their agency in key decision-making domains. This study examines the association between women's household decision-making authority and dietary diversity, and tests whether resource ownership and information exposure moderate that association, using the 2023/24 Nigeria Demographic and Health Survey (NDHS). The analytic sample comprises 22,958 currently married women aged 15–49 years with a co-resident spouse. Poisson regression models with survey weights were estimated to assess the relationship between decision-making authority and the minimum dietary diversity for women (MDD-W) score. Moderation was examined through interaction terms between joint decision-making and each of the two moderators, with marginal associations reported at representative values of each moderator. Because the NDHS is cross-sectional, every estimate reported here is an association measured at a single point in time. No coefficient is interpreted as a causal effect.

Joint participation in healthcare decisions was associated with a 5.6 percent higher MDD-W score relative to exclusion from decisions ($\beta = 0.056$; $p < 0.01$), and independent healthcare authority with a 4.3 percent higher score ($\beta = 0.043$; $p < 0.01$). Joint participation in large-purchase decisions was associated with a 3.2 percent higher score ($\beta = 0.032$; $p < 0.01$) when modelled alone but was not distinguishable from zero once healthcare authority was included. Interaction terms between joint decision-making and each moderator were negative and significant throughout: the association was largest among women with no assets and no media access, and at the maximum of either index the point estimate was fully offset rather than merely attenuated. Confidence intervals at the maximum of each index include zero in five of the six specifications, so the association is best described as eliminated rather than reversed.

Women's meaningful participation in household decision-making is significantly associated with dietary diversity in Nigeria, with the largest differences observed among the most disadvantaged women. Achieving substantive improvements in women's nutrition requires policies that simultaneously address gaps in household agency, asset ownership, and access to information.

Keywords: Dietary diversity, decision-making, women's empowerment, nutrition, Nigeria

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1. Introduction

A well-nourished woman is healthier, more productive, and better positioned to support her family. Women who consume diverse diets are better able to earn a living and provide adequate care for their children, with consequences that carry into the next generation (Maugeri et al., 2025). Where women's diets are compromised, the costs extend beyond individual welfare to household resilience and national development (Njuki et al., 2022; Clement et al., 2019). Despite global commitments to gender equality and nutrition, women continue to bear a disproportionate share of nutritional disadvantage: an estimated 1.2 billion women of reproductive age worldwide are affected by micronutrient deficiencies (Stevens et al., 2022), with sub-Saharan Africa carrying a particularly heavy burden (Adeyeye et al., 2023).

In Nigeria, malnutrition persists even as aggregate food availability has improved (Onyeaka et al., 2024). Gender inequalities shape women's nutritional outcomes through several intersecting pathways, including restrictive gender norms, unequal control over household resources, and limited agency in key decision domains (Muchiri et al., 2025). Understanding women's dietary diversity therefore requires looking inside the household, at who decides what is acquired, prepared, and eaten.

In many households, patriarchal norms and cultural practices reinforce intrahousehold food allocation biases in which women “eat last and least,” constraining their dietary diversity even within food-secure households. In Ethiopia, adolescent girls were expected to eat only after male family members had been served, and were discouraged from consuming spicy foods and milk, a restriction justified as a means of delaying sexual initiation (Gulema et al., 2024). Girls who departed from these expectations faced sanctions, including insults and physical violence from male relatives (Gulema et al., 2024). This suggests that intrahousehold allocation reflects a structure of authority rather than individual preference and that a woman's dietary intake may reflect her standing within the household. Studies reveal that women who live in societies where patriarchy is the norm are more disadvantaged and more likely to be malnourished even in food-secure households (Madjdian, 2018). Comparable dynamics are documented in Nigeria, where gendered food taboos and allocation practices disadvantage women in particular during pregnancy and lactation, when nutritional requirements are elevated (Girard et al., 2021; Harris-Fry et al., 2020).

The logic underpinning these norms is largely economic. In many low- and middle-income settings, where households depend primarily on male income, food is often allocated according to members' actual or expected contribution to the household economy, privileging those identified as breadwinners and disadvantaging those whose economic contribution is unpaid or unrecognized (Madjdian, 2018). These patterns are reflected in household decision-making in Nigeria, which is deeply embedded in patriarchal social structures and cultural norms that privilege male authority in household and economic decisions (Makama, 2013; Jaiyeola, 2020). Men typically dominate decisions on agricultural production, land use, asset ownership, and major household expenditures, while women's authority is often confined to less strategic household-level activities such as daily

food purchases and meal preparation (Slavchevska et al., 2021; Kirui et al., 2026). Evidence from national datasets, including the Living Standards Measurement Study, indicates that women's empowerment levels remain low, with limited participation in decisions about income allocation, credit access, and investment (Ashagidigbi et al., 2022). Because women's ability to influence production decisions constrains the diversity of foods produced and consumed within the household, this exclusion has been associated with measurable nutritional disadvantages, including lower dietary diversity and greater risk of micronutrient deficiency (Amugsi et al., 2016; Ogunniyi et al., 2021; Mohammed et al., 2025; O'Meara et al., 2025).

A substantial body of literature reports a positive relationship between women's decision-making autonomy and dietary diversity. Women with greater control over household decisions achieve higher dietary diversity scores and better nutrition outcomes for their children (Amugsi et al., 2016; Christian, 2023). This relationship is generally attributed to income control and expenditure patterns: when women control financial resources, a larger share tends to be allocated to food consumption and child nutrition than when men do (Duflo, 2012; Eissler and Bryan, 2025; Bhandari, 2025). Ownership of productive assets, and of land in particular, has been argued to operate through a related channel; strengthening women's bargaining position within the household can also strengthen their influence over how resources are allocated (Kirui et al., 2026). Income and assets alone, however, appear insufficient. Without corresponding decision-making authority, women's earnings may not translate into improved dietary outcomes because men's control over resource allocation persists (Anderson and Eswaran, 2020; Malapit and Quisumbing, 2021). The same has been argued of ownership: holding land without authority over its use does not reliably shift intrahousehold allocation (Kirui et al., 2026). Joint decision-making between partners has been associated with better nutrition outcomes than unilateral decision-making by either party (Bonilla et al., 2021).

Despite this evidence, significant gaps remain in translating research into policy and practice. Women's economic empowerment programs, financial inclusion initiatives, and nutrition education have shown promise, but their impact is often constrained by persistent sociocultural norms and weak institutional implementation (Kabeer, 2021; Quisumbing et al., 2021). Emerging evidence suggests that gender-transformative approaches, particularly those that engage men directly and challenge existing power dynamics, are more effective in improving dietary diversity than interventions targeting women alone (Bonilla et al., 2021; Girard et al., 2021). Empirical research consistently links women's empowerment to greater dietary diversity. Sraboni et al. (2014), using the Women's Empowerment in Agriculture Index (WEAI) across 31 developing countries, found greater empowerment significantly associated with higher dietary diversity, with income control and involvement in productive decision-making among the strongest predictors. Hadley et al. (2008) identified women's autonomy in food-purchasing decisions as a strong predictor of dietary diversity for women and their children alike.

Existing Nigerian studies have nonetheless focused predominantly on child nutritional outcomes rather than women's own dietary diversity (Amugsi, Mittelmark, and Oduro, 2015; Fadare et al.,

2019) and have rarely examined whether the association differs across women's circumstances. This study addresses those gaps. Throughout the paper, women's household decision-making authority refers to a woman's reported role in two decision domains: decisions about her own healthcare, and decisions about large household purchases. The study asks two questions. First, is a woman's decision-making authority in these two domains associated with her dietary diversity and net of both household and individual covariates? Second, does the size of that association vary with a woman's endowment of productive assets and of media access, such that it differs across levels of each? The study makes two contributions. First, it addresses an evidence gap using nationally representative data from the 2023/24 NDHS, the most recent national dataset, providing up-to-date evidence on women's food consumption patterns in Nigeria. Second, it moves beyond documenting the association between women's household decision-making authority and dietary diversity by examining whether the strength of this association varies with women's resource ownership and information exposure. The analysis reports marginal associations at each level of these moderators, with findings interpreted as associations rather than causal effects.

2. Methodology

2.1 Data Source and Study Population

This study draws on the 2023/24 Nigeria Demographic and Health Survey (NDHS), a nationally representative cross-sectional survey conducted by the National Population Commission (NPC) in collaboration with ICF International. The NDHS employs a stratified two-stage cluster sampling design, with primary sampling units (clusters) drawn from the 2006 Population and Housing Census enumeration areas and households subsequently selected within each cluster using systematic random sampling. In the 2023/24 round, interviews with 39,050 women aged 15–49 years were completed (FMoHSW, NPC, and ICF, 2024).

As seen in Table 1, the analysis is restricted to currently married women with a co-resident spouse, because the decision-making variables are defined relative to a woman's relationship with her husband and are not asked, or are not comparable, otherwise. Applying that restriction and dropping observations with missing values on the outcome or on any covariate yields an unweighted analytic sample of 22,958 women; the corresponding survey-weighted population total is 23,770.

Table 1. Derivation of the analytic sample

Step	Criterion	N excluded	N remaining
1	Women aged 15–49 years interviewed, 2023/24 NDHS	—	39,050
2	Not currently married	13,411	25,639
3	Currently married, spouse not co-resident	2,681	22,958
4	Missing MDD-W outcome data	0	22,958
5	Missing data on any covariate	0	22,958
6	Final unweighted analytic sample	—	22,958
7	Final weighted analytic sample	—	23,770

Source: Authors' construction from NDHS 2023/24.

2.2 Outcome Variable: Dietary Diversity

The primary outcome is the minimum dietary diversity for women (MDD-W) score: the number of the ten defined food groups a woman consumed in the 24 hours preceding the interview. The ten groups are (1) grains, white roots, tubers, and plantains; (2) pulses; (3) nuts and seeds; (4) dairy; (5) meat, poultry, and fish; (6) eggs; (7) dark green leafy vegetables; (8) other vitamin A-rich fruits and vegetables; (9) other vegetables; and (10) other fruits. Binary indicators for each food group were summed to produce the score, and a binary MDD-W attainment indicator takes the value of 1 where the score is five or more food groups and 0 otherwise. The bounded count score (0–10) is the dependent variable in all regression models, as it preserves the ordinal progression in dietary variety.

2.3 Primary Explanatory Variables: Household Decision-Making Authority

The main explanatory variables capture women's decision-making authority in two household domains: (1) decisions regarding women's own healthcare, and (2) decisions about large household purchases. For each domain, NDHS response codes were recoded into three mutually exclusive categories: woman alone (respondent decides independently), joint decision (respondent and partner decide together), and woman not involved (partner or other household member decides). The not-involved category serves as the reference group in all regression specifications. A composite index was also constructed to capture aggregate decision-making patterns across both domains: the composite joint decision index, representing the proportion of the two decision domains in which a woman participates jointly with her partner.

2.4 Moderating Variables

2.4.1 Resource Ownership Index

The resource ownership index is a composite of two binary indicators: ownership of a house and ownership of land in any form. It is the mean of the two and therefore takes the values 0, 0.5, and 1. It is used as a moderator: the analysis asks whether the association between decision-making participation and dietary diversity differs by the number of productive assets a woman holds.

2.4.2 Information Exposure Index

The information exposure index is a composite of three indicators: reading a newspaper, listening to the radio, and watching television, at any frequency. It is the mean of the three and therefore takes the values 0, 0.33, 0.67, and 1. It is used as a moderator because media access is an alternative route to dietary information and may substitute for the information a woman obtains through participation in household decisions.

2.5 Control Variables

A comprehensive set of household- and individual-level controls is included in all regression specifications. Household composition is controlled through women's household headship, household size, and the number of children under the age of five. Individual-level controls include the woman's age in years and current employment status. Additional controls include wealth, place of residence, geopolitical zone, and education level.

The wealth measure is the standard NDHS wealth index. It is constructed by a principal components analysis of household ownership of selected assets and consumer durables; dwelling characteristics, including flooring, roofing and wall materials; and access to water and sanitation, with households then assigned to population quintiles. Because the index incorporates dwelling and asset items closely related to the house- and land-ownership items that form the resource ownership index, the two measures overlap. In the moderation models, this overlap inflates the standard error on the interaction between decision-making and resource ownership rather than biasing it: wealth enters as a covariate rather than as a variable positioned on a pathway, so the interaction is identified from variation in asset ownership within wealth quintiles. Appendix Tables A1 and A2 report every moderation model with and without the wealth quintile indicators, estimated on the same sample, so that the consequence of the overlap is visible.

3. Analytical Strategy

3.1 Descriptive and Regression Analysis

Sociodemographic and economic characteristics, as well as decision-making autonomy, resource ownership, and media exposure, were compared across MDD-W groups. The association between household decision-making and dietary diversity was estimated using Poisson regression with survey weights. Poisson regression is appropriate here because the outcome is a bounded count of food groups (0–10) rather than an unbounded continuous measure. Its coefficients are interpretable as semi-elasticities on the log scale, so that a coefficient of 0.056 corresponds to approximately a 5.6 percent difference in the expected number of food groups consumed. Exponentiated, they are prevalence ratios. They are not incidence rate ratios: “incidence” denotes a rate accruing over a period of follow-up, whereas a single-round cross-sectional survey records status at one point in time rather than events over an interval. All models are estimated with the survey design declared, so that standard errors account for stratification and for clustering on the primary sampling unit.

Four specifications were estimated: Model 1 includes the healthcare decision variables only; Model 2 the purchase decision variables only; Model 3 both domains together; and Model 4 adds both moderators and all four interaction terms to Model 3. The same sequential strategy is applied to the resource ownership and information exposure variables. All models include the full set of control variables described in Section 2.5.

3.2 Moderation Analysis

Moderation analysis examines whether the dietary diversity difference associated with joint decision-making is conditional on women's ownership of resources or exposure to information. Multiplicative interaction terms are introduced into the Poisson models by interacting each joint decision-making variable with the resource ownership index and, in separate models, with the information exposure index. Because an interaction coefficient alone does not reveal the magnitude, sign, or precision of the association at any particular level of the moderator, the marginal association between joint decision-making and dietary diversity is also computed at each value the moderator can take, with 95 percent confidence intervals (CI) obtained.

4. Results

4.1 Descriptive Statistics by Dietary Diversity Status

Table 2 presents survey-weighted means for all key variables stratified by MDD-W status, along with group differences and associated significance levels. Across every dimension of women's agency, resource ownership, informational access, and socioeconomic circumstance, women who met the dietary diversity threshold (MDD-W score ≥ 5) recorded higher values than those who did not. Regarding household decision-making, women who met the MDD-W threshold were more likely to participate in household decisions than those who did not. Joint decision-making on healthcare was reported by 39.9 percent of women meeting the threshold, compared with 32.2 percent of those below it, representing a difference of 7.8 percentage points ($p < 0.01$). Similarly, joint decision-making on large household purchases was higher among women meeting the threshold (39.2 percent) than those who did not (32.2 percent), a difference of 7.0 percentage points ($p < 0.01$).

Resource ownership was also positively associated with meeting the MDD-W threshold. Women with adequate dietary diversity were more likely to own a house (15.3 percent versus 11.1 percent; difference = 4.2 percentage points, $p < 0.01$) and land (13.9 percent versus 11.0 percent; difference = 2.9 percentage points, $p < 0.01$). The resource ownership index was likewise higher among women meeting the threshold (0.146 versus 0.111), indicating a statistically significant difference of 0.035 ($p < 0.01$). Women meeting the MDD-W threshold were more likely to read newspapers (11.6 percent versus 5.7 percent; difference = 5.9 percentage points, $p < 0.01$), listen to the radio (54.1 percent versus 40.7 percent; difference = 13.4 percentage points, $p < 0.01$), and watch television (49.6 percent versus 32.5 percent; difference = 17.1 percentage points, $p < 0.01$). The

media exposure index was also higher among women meeting the threshold, with a difference of 0.121 ($p < 0.01$).

Overall, the descriptive results demonstrate that meeting the minimum dietary diversity threshold is associated with greater participation in household decision-making, higher resource ownership, greater media exposure, older age, employment, urban residence, higher household wealth, greater educational attainment, and geographical location. Conversely, women who did not meet the threshold were more likely to belong to poorer wealth quintiles, have no formal education, reside in rural areas, and live in the North–East.

Table 2. Descriptive Statistics by Minimum Dietary Diversity Status (MDD-W)

Variable	MDD-W < 5 Mean (SE)	MDD-W ≥ 5 Mean (SE)	Difference
<i>Decision-Making Variables</i>			
Healthcare: woman alone	0.106 (0.004)	0.147 (0.006)	0.041***
Healthcare: joint decision	0.322 (0.008)	0.399 (0.009)	0.078***
Large purchases: woman alone	0.058 (0.004)	0.071 (0.004)	0.012**
Large purchases: joint decision	0.322 (0.007)	0.392 (0.009)	0.070***
Composite: woman alone index	0.082 (0.003)	0.109 (0.004)	0.027***
Composite: joint decision index	0.322 (0.007)	0.395 (0.008)	0.074***
<i>Resource Ownership</i>			
Owns a house (any form)	0.111 (0.005)	0.153 (0.007)	0.042***
Owns land (any form)	0.110 (0.004)	0.139 (0.006)	0.029***
Resource ownership index	0.111 (0.004)	0.146 (0.005)	0.035***
<i>Information Exposure</i>			
Reads newspaper (any)	0.057 (0.003)	0.116 (0.005)	0.059***
Listens to radio (any)	0.407 (0.008)	0.541 (0.012)	0.134***
Watches television (any)	0.325 (0.009)	0.496 (0.013)	0.171***
Media exposure index	0.263 (0.006)	0.385 (0.009)	0.121***
<i>Household and Demographic Characteristics</i>			
Female household head	0.029 (0.002)	0.040 (0.003)	0.011***
Household size	6.722 (0.083)	6.470 (0.106)	-0.251**
Number of children under 5	1.612 (0.025)	1.378 (0.028)	-0.233***
Woman's age (years)	31.696 (0.109)	32.935 (0.146)	1.239***
Currently employed	0.574 (0.008)	0.694 (0.008)	0.120***
Urban residence	0.361 (0.010)	0.493 (0.012)	0.132***
Rural residence	0.639 (0.010)	0.507 (0.012)	-0.132***
<i>Wealth Quintile</i>			
Poorest	0.253 (0.011)	0.142 (0.009)	-0.111***
Poorer	0.240 (0.009)	0.173 (0.010)	-0.067***
Middle	0.194 (0.008)	0.194 (0.009)	0.000
Richer	0.165 (0.007)	0.212 (0.008)	0.046***
Richest	0.146 (0.006)	0.278 (0.010)	0.132***
<i>Education Level</i>			
No formal education	0.518 (0.012)	0.348 (0.013)	-0.170***
Primary	0.121 (0.005)	0.121 (0.005)	-0.000
Secondary	0.275 (0.008)	0.357 (0.009)	0.082***
Higher education	0.086 (0.004)	0.174 (0.007)	0.088***
<i>Geopolitical Region</i>			
North–West	0.358 (0.011)	0.399 (0.013)	0.042***
North–East	0.214 (0.011)	0.096 (0.007)	-0.118***
North–Central	0.196 (0.010)	0.164 (0.008)	-0.032***
South–East	0.056 (0.004)	0.071 (0.003)	0.014***
South–South	0.075 (0.004)	0.104 (0.005)	0.029***
South–West	0.100 (0.005)	0.165 (0.008)	0.066***

Source: Authors' construction from NDHS 2023/24.

Note: Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Survey-weighted means; standard errors in parentheses. The dietary diversity indicator is referred to as MDD-W throughout.

4.2 Decision-making Authority and Dietary Diversity

Table 3 presents Poisson regression results for four specifications of the decision-making model. In Model 1, joint and independent healthcare decision-making are positively associated with dietary diversity ($\beta = 0.056$; $p < 0.01$; $\beta = 0.043$; $p < 0.01$, respectively). In Model 2, joint decision-making over household purchases is also positively associated with the number of food groups consumed ($\beta = 0.032$; $p < 0.01$), whereas independent purchase decision-making is not statistically significant.

In Model 3, both joint and independent healthcare decision-making remain positive and significant ($\beta = 0.054$ and $\beta = 0.050$, respectively; $p < 0.01$), while purchase-related decision-making variables are insignificant. These findings suggest that women's involvement in healthcare decisions are consistently associated with dietary diversity than their authority over household purchases. In Model 4, joint ($\beta = 0.082$, $p < 0.01$) and independent ($\beta = 0.037$, $p < 0.05$) healthcare decision-making remain positively associated with dietary diversity. Resource ownership ($\beta = 0.121$, $p < 0.01$) and information exposure ($\beta = 0.138$, $p < 0.01$) are also positively associated with dietary diversity. However, the interaction between joint healthcare decision-making and resource ownership is negative and significant ($\beta = -0.090$, $p < 0.01$), indicating that the association between joint healthcare decision-making and dietary diversity weakens as resource ownership increases. The other interaction terms are not statistically significant.

Table 3. Decision-making Authority and Women's Dietary Diversity Score

Variable	Model 1 (Healthcare)	Model 2 (Purchases)	Model 3 (Combined)	Model 4 (Full)
Healthcare: joint decision	0.056*** (0.013)	—	0.054*** (0.016)	0.082*** (0.025)
Healthcare: woman alone	0.043*** (0.015)	—	0.050*** (0.016)	0.037** (0.016)
Purchases: joint decision	—	0.032*** (0.009)	0.002 (0.012)	0.004 (0.022)
Purchases: woman alone	—	0.0002 (0.017)	-0.024 (0.019)	-0.022 (0.019)
Resource ownership index	—	—	—	0.121*** (0.020)
Information exposure index	—	—	—	0.138*** (0.025)
Joint health $\times$ Resource index	—	—	—	-0.090*** (0.028)
Joint health $\times$ Information index	—	—	—	-0.052 (0.037)
Joint purchase $\times$ Resource index	—	—	—	0.002 (0.029)
Joint purchase $\times$ Information index	—	—	—	-0.011 (0.035)
Observations (unweighted)	22,958	22,958	22,958	22,958
Observations (weighted)	23,770	23,770	23,770	23,770

Source: Authors' construction from NDHS 2023/24.

Note: Reference category for decision-making variables: woman not involved. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. All models adjust for female household headship, household size, children under five, woman's age, employment, urban residence, wealth quintile, geopolitical zone, and education. Covariate coefficients are not shown.

4.3 Resource Ownership and Dietary Diversity

Table 4 examines the association between house and land ownership and women's dietary diversity, measured by the number of food groups consumed. In Model 1, house ownership is positively associated with dietary diversity ($\beta = 0.058$, $p < 0.01$). Similarly, Model 2 shows a positive association between land ownership and dietary diversity ($\beta = 0.069$, $p < 0.01$). When

both assets are included in Model 3, house ownership remains positive and significant ($\beta = 0.036$, $p < 0.05$), as does land ownership ($\beta = 0.053$, $p < 0.01$). Although both coefficients decline in the combined model, their continued significance suggests that each asset retains an independent association with the expected number of food groups consumed, controlling for the other asset and relevant socioeconomic and demographic characteristics. Overall, the findings indicate that house and land ownership are positively associated with women's dietary diversity, with land ownership exhibiting a larger estimated coefficient.

Table 4. Resource Ownership and Women's Dietary Diversity Score

Variable	Model 1 (House)	Model 2 (Land)	Model 3 (Combined)
Owns a house (any form)	0.058*** (0.013)	—	0.036** (0.014)
Owns land (any form)	—	0.069*** (0.012)	0.053*** (0.013)
Observations (unweighted)	22,958	22,958	22,958
Observations (weighted)	23,770	23,770	23,770

Source: Authors' construction from NDHS 2023/24.

Note: All models adjust for the full covariate vector; covariate coefficients not shown. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.4 Information Exposure and Dietary Diversity

Table 5 reports results for the information exposure models. All three media channels—newspaper (0.067; $p < 0.01$), radio (0.048; $p < 0.01$), and television (0.048; $p < 0.01$)—show positive and statistically significant associations with the dietary diversity score when modelled individually. In the combined Model 4, all three channels remain significant, with coefficients of 0.057, 0.038, and 0.031, respectively.

Table 5. Information Exposure and Women's Dietary Diversity Score

Variable	Model 1 (Newspaper)	Model 2 (Radio)	Model 3 (Television)	Model 4 (Combined)
Reads newspaper	0.067*** (0.014)	—	—	0.057*** (0.014)
Listens to radio	—	0.048*** (0.011)	—	0.038*** (0.011)
Watches television	—	—	0.048*** (0.014)	0.031** (0.014)
Observations (unweighted)	22,958	22,958	22,958	22,958
Observations (weighted)	23,770	23,770	23,770	23,770

Source: Authors' construction from NDHS 2023/24.

Note: All models adjust for the full covariate vector; covariate coefficients not shown. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.5 Moderation Analysis

4.5.1 Moderation by Resource Ownership

Table 6 presents moderation results using the resource ownership index. Interaction coefficients are negative and significant across all specifications: healthcare $\times$ resources (-0.100 ; $p < 0.01$), purchases $\times$ resources (-0.064 ; $p < 0.05$), and composite index $\times$ resources (-0.099 ; $p < 0.01$). The main effect of the resource ownership index is large, positive, and highly significant across all three models, ranging from 0.117 to 0.132 ($p < 0.01$).

The marginal associations implied by these coefficients are reported in Table 8. At zero resource ownership, the association between the composite joint index and the dietary diversity score is 0.060 (95 percent CI 0.036 to 0.085; $p < 0.001$). At an index value of 0.5, it is 0.011 and no longer distinguishable from zero (95 percent CI -0.015 to 0.036 ; $p = 0.41$), and at full ownership it is -0.039 (95 percent CI -0.086 to 0.008 ; $p = 0.10$). The corresponding figures for healthcare authority are 0.057 ($p < 0.001$), 0.006 ($p = 0.60$) and -0.044 , the latter being the only estimate in this panel whose interval excludes zero (95 percent CI -0.086 to -0.002 ; $p = 0.041$). For purchase authority, the sequence is 0.040 ($p < 0.001$), 0.008 ($p = 0.47$), and -0.024 ($p = 0.26$).

Table 6. Decision-making and Dietary Diversity: Moderation by Resource Ownership

Variable	Model 1 (Healthcare)	Model 2 (Purchases)	Model 3 (Joint Index)
Healthcare: joint decision	0.057*** (0.012)	—	—
Healthcare: joint $\times$ resource index	-0.100*** (0.025)	—	—
Purchases: joint decision	—	0.040*** (0.010)	—
Purchases: joint $\times$ resource index	—	-0.064** (0.025)	—
Composite joint decision index	—	—	0.060*** (0.012)
Composite joint index $\times$ resource index	—	—	-0.099*** (0.028)
Resource ownership index	0.132*** (0.020)	0.117*** (0.020)	0.132*** (0.021)
Observations (unweighted)	22,958	22,958	22,958
Observations (weighted)	23,770	23,770	23,770

Source: Authors' construction from NDHS 2023/24.

Note: All models adjust for the full covariate vector; covariate coefficients not shown. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.5.2 Moderation by Information Exposure

Table 7 introduces interaction terms between joint decision-making and the information exposure index. The interaction coefficients are negative and significant across all specifications: joint healthcare $\times$ information (-0.081 ; $p < 0.01$), joint purchases $\times$ information (-0.062 ; $p < 0.05$), and composite index $\times$ information (-0.085 ; $p < 0.01$). The main effect of the information exposure index is positive and highly significant throughout, ranging from 0.143 to 0.152 ($p < 0.01$).

The associated marginal associations are reported in Table 8. Because the information exposure index is the mean of three binary items, it takes the values 0, 0.33, 0.67, and 1, and is evaluated at each. For the composite joint index, the association is 0.077 at zero exposure (95 percent CI 0.042 to 0.113; $p < 0.001$), 0.049 at one-third (95 percent CI 0.027 to 0.071; $p < 0.001$), 0.020 at two-thirds (95 percent CI -0.003 to 0.044 ; $p = 0.084$), and -0.008 at maximum exposure (95 percent CI -0.045 to 0.029 ; $p = 0.67$). For healthcare authority, the sequence is 0.072, 0.045, 0.018, and -0.009 ; for purchase authority, 0.054, 0.034, 0.013, and -0.007 . The decline is gradual rather than abrupt: the association remains significant at one-third of maximum exposure across all three specifications, falls below conventional significance at two-thirds, and is indistinguishable from zero at the top of the range.

Table 7. Decision-making and Dietary Diversity: Moderation by Information Exposure

Variable	Model 1 (Healthcare)	Model 2 (Purchases)	Model 3 (Joint Index)
Healthcare: joint decision	0.072*** (0.017)	—	—
Healthcare: joint × information index	-0.081*** (0.028)	—	—
Purchases: joint decision	—	0.054*** (0.015)	—
Purchases: joint × information index	—	-0.062** (0.027)	—
Composite joint decision index	—	—	0.077*** (0.018)
Joint index × information index	—	—	-0.085*** (0.030)
Information exposure index	0.150*** (0.025)	0.143*** (0.025)	0.152*** (0.026)
Observations (unweighted)	22,958	22,958	22,958
Observations (weighted)	23,770	23,770	23,770

Source: Authors' construction from NDHS 2023/24.

Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. All models adjust for female household headship, household size, number of children under five, woman's age, current employment status, urban/rural residence, wealth quintile, geopolitical zone, and education level. Covariate coefficients are not reported. Marginal associations at representative values of the moderator are reported in Table 8.

4.5.3 Marginal Associations at Representative Values of Each Moderator

Table 8 reports the marginal association between joint decision-making and the MDD-W score at each value the moderator indexes can take, with delta-method 95 percent confidence intervals. The direction of the pattern is the same for both moderators: a positive and significant association among women with no assets and no media access, declining monotonically as endowment rises, with a point estimate at or slightly below zero at the top of the range. At zero endowment, the six estimates range from 0.040 to 0.077, all significant at $p < 0.001$. The intervals distinguish the two moderators at the top of the range. For information exposure, all three estimates at maximum exposure fall within 0.009 of zero, with p -values between 0.60 and 0.67; these are consistent with a null association and do not support a claim of reversal. For resource ownership, the three estimates at full ownership are -0.024, -0.039, and -0.044, of which only the last, healthcare authority, has an interval excluding zero, and then marginally ($p = 0.041$). The evidence supports the conclusion that the association is eliminated at the top of either moderator's range; it does not establish that it becomes negative.

Figure 1 plots these marginal associations. Both panels decline monotonically and cross zero: the association between joint decision-making and dietary diversity is positive and significant among women with no assets and no media access, and indistinguishable from zero by the upper end of either index. Two features distinguish the panels. The resource ownership association crosses zero at an index value of approximately 0.6, against approximately 0.9 for information exposure, so the association is extinguished at a lower level of endowment for assets than for media access. And the confidence intervals widen markedly toward the right of the resource ownership panel, from 0.010 at zero to 0.024 at full ownership, while those in the information exposure panel are narrowest at interior values and widen only modestly at the extremes. The contrast reflects where the data lie: comparatively few women own both a house and land, whereas media exposure is more evenly distributed. The straight line in each panel is imposed by the single multiplicative interaction term and is not itself evidence that the relationship is linear in the moderator.

Table 8. Marginal Association between Joint Decision-making and MDD-W Score at Representative Values of Each Moderator

	Estimate	SE	95 CI low	95 CI high	p
Moderator: Resource Ownership Index					
Health dec.= 0	0.0566	0.0118	0.0335	0.0797	0.0000
Health dec.= 0.5	0.0064	0.0121	-0.0174	0.0302	0.5986
Health dec.= 1	-0.0439	0.0214	-0.0859	-0.0018	0.0408
Purchase dec.= 0	0.0403	0.0104	0.0200	0.0606	0.0001
Purchase dec.= 0.5	0.0081	0.0112	-0.0138	0.0301	0.4675
Purchase dec.= 1	-0.0240	0.0215	-0.0662	0.0181	0.2636
Composite dec.= 0	0.0602	0.0124	0.0358	0.0846	0.0000
Composite dec.= 0.5	0.0106	0.0128	-0.0146	0.0357	0.4102
Composite dec.= 1	-0.0391	0.0239	-0.0859	0.0077	0.1016
Moderator: Information Exposure Index					
Health dec.= 0	0.0721	0.0174	0.0379	0.1062	0.0000
Health dec.= 0.33	0.0451	0.0110	0.0235	0.0667	0.0000
Health dec.= 0.67	0.0182	0.0107	-0.0029	0.0392	0.0903
Health dec.= 1	-0.0088	0.0169	-0.0419	0.0243	0.6036
Purchase dec.= 0	0.0544	0.0153	0.0243	0.0844	0.0004
Purchase dec.= 0.33	0.0338	0.0094	0.0154	0.0523	0.0003
Purchase dec.= 0.67	0.0133	0.0100	-0.0063	0.0329	0.1838
Purchase dec.= 1	-0.0072	0.0164	-0.0394	0.0249	0.6596
Composite dec.= 0	0.0773	0.0179	0.0422	0.1125	0.0000
Composite dec.= 0.33	0.0489	0.0113	0.0267	0.0711	0.0000
Composite dec.= 0.67	0.0204	0.0118	-0.0027	0.0436	0.0836
Composite dec.= 1	-0.0080	0.0188	-0.0449	0.0288	0.6691

Source: Authors' construction from NDHS 2023/24

Note: The two indices have different supports: the resource ownership index is the mean of two binary items and takes 0, 0.5, and 1; the information exposure index is the mean of three binary items and takes 0, 0.33, 0.67, and 1.

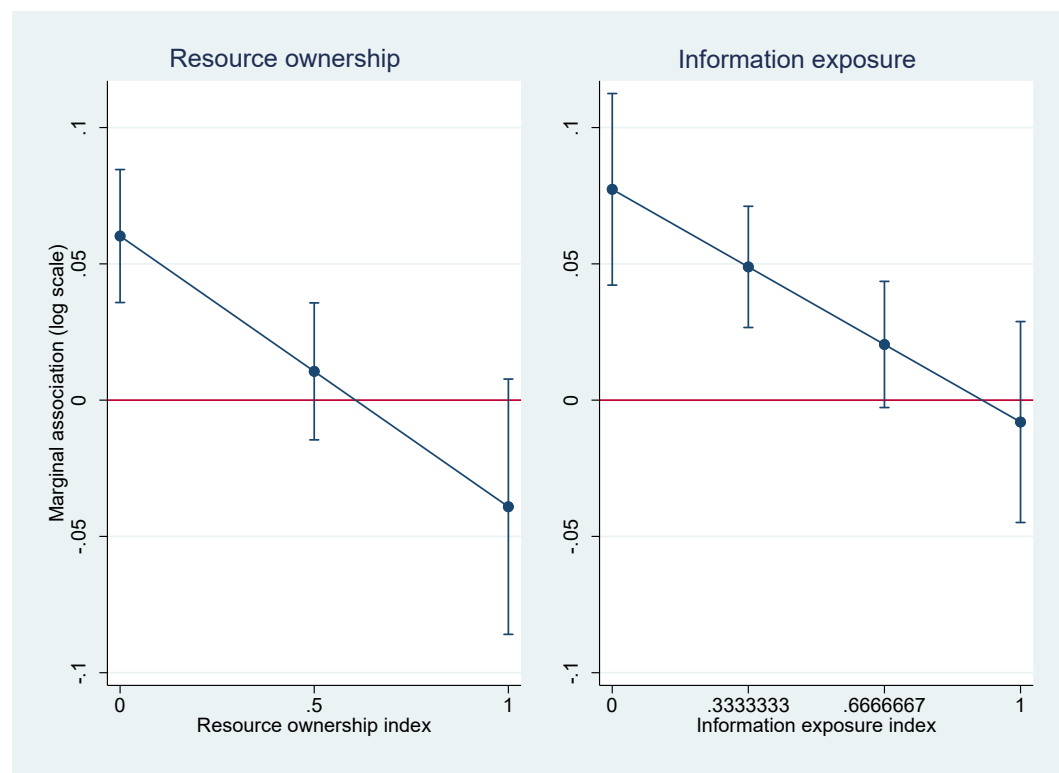


Figure 1. Marginal Association Between Joint Decision-making and Dietary Diversity

Source: Authors' construction from NDHS 2023/24.

Note: Each panel plots the marginal association between the composite joint decision index and the MDD-W score at every value the moderator can take, on the log scale, with delta-method 95 percent confidence intervals. The resource ownership index is the mean of two binary items and takes 0, 0.5, and 1; the information exposure index is the mean of three and takes 0, 1/3, 2/3, and 1. The horizontal line marks zero. Estimates are from Model 3 of Tables 6 and 7 and correspond to the composite rows of Table 8.

5. Discussion

5.1 Decision-making Authority and Dietary Diversity

The association between decision-making participation and dietary diversity reported here is consistent with a growing body of evidence linking women's empowerment to nutritional outcomes. Sraboni et al. (2014) identified decision-making participation as a strong predictor of dietary diversity using WEAI across 31 countries, as did Amugsi et al. (2016) in their multi-country analysis of sub-Saharan Africa. Healthcare decisions concern a domain closely connected to women's bodily autonomy and nutritional self-awareness, which is one possible reason why that domain shows the strongest association and why the purchase-domain coefficient falls to zero once healthcare authority is included. An alternative reading is that the two domains largely measure the same underlying construct, in which case the combined model is separating little real variation; the descriptive statistics, in which the two joint-decision proportions are almost identical (0.399 and 0.392 among women meeting the threshold), are consistent with that possibility.

That joint decision-making is more strongly associated with dietary diversity than independent authority is consistent with evidence from South Asia, where negotiated intracouple decision-making is linked to better nutritional outcomes than unilateral control by women (Hadley et al., 2008). Structural determinants including wealth, education, and regional location remain strongly associated with dietary diversity (Ariyo et al., 2025; Onyeji and Sanusi, 2020). The North-East coefficient is among the largest in the model and persists across all specifications, which is consistent with the compound disadvantage documented for that region: the highest rates of poverty and food insecurity in Nigeria, prolonged insecurity associated with the Boko Haram insurgency, and persistently low human development indicators (Eke-okocha and Eze, 2023; Olanrewaju and Balana, 2023). The education gradient is consistent with more educated women having greater nutritional knowledge, a stronger intrahousehold negotiating position, higher earning potential, and greater engagement with health information systems (Richards et al., 2013; Quisumbing et al., 2021). These covariate coefficients are, however, adjusted estimates from a model designed to isolate the decision-making association, and they are not the object of the study; they should not be read as estimates of the effect of wealth, education or region on diet.

For the moderation results, the interaction coefficients are negative, relatively large compared to the main effects, and significant across every specification. For the composite joint index interacted with information exposure, the association falls from 0.077 at zero exposure to -0.008 at maximum exposure, a change equal to about 110 percent of the value at zero. For resource ownership, the offset is larger still, at roughly 165 percent. Halving the association would require

an interaction coefficient near -0.039 in the information model and near -0.030 in the resource model; the estimates are -0.085 and -0.099 , more than twice and more than three times those magnitudes.

For information exposure, the three estimates lie within 0.009 of zero, with p-values between 0.60 and 0.67 at maximum exposure. Media access provides an alternative route to dietary information, so participation in household decisions adds little for women who already have it. For resource ownership, the picture is less settled. The point estimates at full ownership are negative in all three specifications, and in the healthcare model the interval excludes zero (-0.086 to -0.002 ; $p = 0.041$). Taken alone, that would suggest something stronger than substitution: that among asset-owning women, joint decision-making is associated with lower dietary diversity. But it is one marginal result among nine in that panel, and the estimates at the top of the resource index rest on a thin part of the distribution: the mean index is 0.111 among women below the dietary threshold and 0.146 among those above it, so comparatively few women own both a house and land. The standard errors reflect this widening, increasing from 0.010 at zero to 0.024 at full ownership. The responsible reading is elimination in both cases, with a negative point estimate for resource ownership that the data are not powered to confirm. Asset ownership and media exposure are each strongly associated with dietary diversity in their own right; the moderator main effects range from 0.117 to 0.132 and from 0.143 to 0.152, larger than the decision-making coefficients they condition. Thus, whatever links household authority to diet in these data operates largely independently of both.

5.2 Limitation

First, the NDHS is cross-sectional, so every estimate reported here is an association measured at a single point in time. Reverse causality cannot be ruled out: women with more diverse diets may, for that reason, participate more in household decisions just as readily as the converse. Second, the analysis is restricted to currently married women with a co-resident spouse, because the decision-making questions are defined relative to a woman's relationship with her husband. This excludes 13,411 women who were not currently married and a further 2,681 whose spouse was not co-resident. Taken together, the total number of women excluded more than two-fifths of the women interviewed. The findings therefore do not extend to unmarried, widowed, divorced or separated women, or to women whose husbands live elsewhere. Third, the resource ownership index is the mean of two binary items and takes three values; the information exposure index is the mean of three and takes four. Neither captures the extent or quality of what it measures, namely the value of a landholding, or the content of what is read or watched. Few women sit at the top of the resource ownership index, and the standard errors on the marginal associations reflect this.

Fourth, the DHS wealth index adjusted for every specification is constructed partly from household assets and dwelling characteristics and therefore overlaps the house- and land-ownership items comprising the resource ownership moderator. Because wealth enters as a covariate rather than as

a variable positioned on a pathway, this inflates the standard error on that interaction rather than biasing it. This means the interaction is identified only from variation in asset ownership within wealth quintiles. Fifth, the decision-making variables record reported participation rather than its quality, its durability, or the weight a woman's view carries in a joint decision, and the NDHS offers only two domains, which may not span what household authority means in practice. The near-identical proportions reporting joint participation in the two domains: 0.399 and 0.392 among women meeting the dietary threshold, suggest they may capture a single underlying construct rather than two distinct ones. Sixth, MDD-W is constructed from a single 24-hour recall and therefore reflects one day's intake rather than habitual diet. Finally, this analysis identifies where the association between household authority and dietary diversity is strongest, not why it arises.

5.3 Policy Implications

The moderation results are consistent across all six specifications and indicate that the association between participation in household decision-making and dietary diversity is concentrated among women with the fewest productive assets and the least access to media. At zero endowment on either index, the association ranges from $\beta = 0.040$ to $\beta = 0.077$ and is statistically significant at $p < 0.001$ in every specification (Table 8); at the upper bound of either index, it is statistically indistinguishable from zero. If this association reflects a modifiable relationship, the implication concerns targeting rather than universal provision. Measures to expand women's participation in household decisions would be expected to be most consequential for women who are simultaneously asset-poor, information-poor, and excluded from household authority, a subgroup that is both substantial and readily identifiable in routine survey data.

This finding should not, however, be interpreted as evidence that decision-making authority constitutes the principal determinant of dietary diversity. The main effects of the two moderators substantially exceed the decision-making coefficients they condition: 0.117 to 0.132 for resource ownership and 0.143 to 0.152 for information exposure, compared with 0.040 to 0.077 for joint decision-making (Tables 5 and 6). Asset ownership and media access are each independently, and more strongly, associated with dietary diversity. The contribution of these interaction terms establishes that these associations operate largely independently of household authority rather than conditionally upon it. The three factors therefore appear to function as alternative routes to improved dietary diversity rather than complementary ones, which favors extending provision to women possessing none of them over intensifying provision among women who already possess one.

The observed gradient is equally consistent with a substitution mechanism and with diminishing marginal returns: women who own productive assets and have regular media exposure already report higher dietary diversity, leaving less scope for decision-making authority to contribute further, and a single cross-section cannot distinguish a woman for whom authority would confer no benefit from one who has already obtained an equivalent benefit through another channel. The exposure examined here is joint participation with a spouse rather than a woman's independent

control; the relevant policy unit is therefore the couple rather than the individual woman, and these results complement rather than supersede evidence that gender-transformative approaches engaging men directly outperform interventions directed at women alone (Bonilla et al., 2021; Girard et al., 2021).

6. Conclusion

This study provides nationally representative evidence that women's household decision-making authority is independently and meaningfully associated with dietary diversity in Nigeria. Women who participate jointly in decisions about their own healthcare and about large household purchases consume a significantly wider variety of food groups than those excluded from such decisions, and this association persists after adjusting for wealth, education, employment, region, and household-level characteristics; in the combined specification, the healthcare domain accounts for that association. Asset ownership and media exposure are each independently associated with dietary diversity, and more strongly than decision-making participation itself, but the association between household authority and diet is largely independent of both. The largest differences associated with decision-making participation are observed among women who are simultaneously the most asset-poor and least connected to information sources.

The persistent pattern in which women eat last and least (Madjidian, 2018) is not primarily a consequence of food unavailability but reflects deeply embedded power asymmetries within households that shape who decides what is purchased, prepared, and consumed. Addressing women's dietary diversity therefore requires interventions that directly challenge these asymmetries by expanding women's meaningful participation in household decisions, strengthening their ownership of productive assets, and broadening their access to nutritional information through diverse media channels. Nigeria's most nutritionally at-risk women—namely those in the North-East, in the poorest wealth quintiles, with no formal education, and excluded from both household decisions and information environments—require targeted, context-sensitive programming that addresses multiple, overlapping disadvantages simultaneously.

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Appendix

Appendix Table A1: Moderation by Resource Ownership, With and Without the Wealth Quintile Covariate

	(1) Health: with	(2) Health: without	(3) Purch: with	(4) Purch: without	(5) Composite: with	(6) Composite: without
MDD-W score:						
food groups consumed (0-10)						
Healthcare: joint decision	0.057*** (0.012)	0.057*** (0.012)				
Resource ownership index (0, 0.5, 1)	0.132*** (0.020)	0.131*** (0.020)	0.117*** (0.020)	0.117*** (0.020)	0.132*** (0.020)	0.132*** (0.020)
Healthcare: joint decision #	-0.100*** (0.025)	-0.106*** (0.025)				
Resource ownership index (0, 0.5, 1)						
Purchases: joint decision			0.040*** (0.010)	0.041*** (0.010)		
Purchases: joint decision #			-0.064** (0.025)	-0.072*** (0.025)		
Resource ownership index (0, 0.5, 1)						
Joint decision index (0, 0.5, 1)					0.060*** (0.012)	0.061*** (0.012)
Joint decision index (0, 0.5, 1) #					-0.099*** (0.028)	-0.107*** (0.028)
Resource ownership index (0, 0.5, 1)						
N	22958	22958	22958	22958	22958	22958

Note: The NDHS wealth index overlaps the house and land items in the resource ownership index; because wealth enters as a covariate rather than on the pathway, this inflates standard errors without biasing the interaction.

Columns differ only in whether the wealth quintile indicators are included.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix Table A2: Moderation by Information Exposure, With and Without Wealth

	(1) Health: with	(2) Health: without	(3) Purch: with	(4) Purch: without	(5) Composite: with	(6) Composite: without
MDD-W score:						
food groups consumed (0-10)						
Healthcare: joint decision	0.072*** (0.017)	0.072*** (0.017)				
Information exposure index (0, 1/3, 2/3, 1)	0.150*** (0.025)	0.179*** (0.026)	0.143*** (0.025)	0.173*** (0.026)	0.152*** (0.026)	0.182*** (0.027)
Healthcare: joint decision #	-0.081*** (0.028)	-0.082*** (0.028)				
Information exposure index (0, 1/3, 2/3, 1)						
Purchases: joint decision			0.054*** (0.015)	0.055*** (0.015)		
Purchases: joint decision #			-0.062** (0.027)	-0.066** (0.027)		
Information exposure index (0, 1/3, 2/3, 1)						
Joint decision index (0, 0.5, 1)					0.077*** (0.018)	0.078*** (0.018)
Joint decision index (0, 0.5, 1) #					-0.085*** (0.030)	-0.089*** (0.030)
Information exposure index (0, 1/3, 2/3, 1)						
N	22958	22958	22958	22958	22958	22958

Note: The NDHS wealth index overlaps the house and land items in the resource ownership index; because wealth enters as a covariate rather than on the pathway, this inflates standard errors without biasing the interaction.

Columns differ only in whether the wealth quintile indicators are included.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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