



## ORIGINAL ARTICLE

# Constraints of Workload in Agricultural Food Production on Children Nutritional Status, Feeding and Hygiene Practices among Rural Women in Ibadan, Nigeria

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## Abstract

Childhood malnutrition, morbidity, and mortality depend not only on food intake but also on care behaviors commonly affected by the economic character of the primary caregiver, usually the mother. The objective of this study was to examine the constraints of workload in agricultural food production on children's nutritional status, feeding, and hygiene practices among rural women in Ibadan, Nigeria. This descriptive and cross-sectional study employed a multi-stage sampling technique and recruited 217 mother-child pairs from agrarian communities of Ibadan. Socio-demographic and personal characteristics of mothers and their children were obtained. The workload in farming was determined using 24-hour physical activity recall and categorized as light ( $\leq 20$ ), moderate ( $> 20-40$ ), and heavy ( $> 40$ ) Metabolic Equivalent-hours per day (MET-hours/day). Child anthropometry was measured and expressed as stunting (height-for-age), wasting (weight-for-height) and underweight (weight-for-age). Feeding and hygiene practices of mothers were assessed using standard procedures. Data were analyzed using descriptive and inferential statistics and level of significance was set at  $p < 0.05$ . The mean age of mothers and under-five children was  $32.32 \pm 6.2$  years and  $35.3 \pm 14.1$  months respectively. Many (62.2%) of the mothers had no formal education and 59.4% and 40.6% of the children were male and female respectively. Mean workload of mothers was  $34.4 \pm 10.1$  MET-hours/day with 58.5% and 32.7% of the mothers having moderate and heavy workloads respectively. Among children, underweight, stunting, and wasting were 30.4%, 40.6%, and 7.8%, respectively. There was a significant negative correlation between mothers' agricultural workload and height-for-age ( $r = -0.128$ ) and weight-for-age ( $r = -0.113$ ) of their children. The prevalence of exclusive breastfeeding was 3.2% and mothers' workload negatively

and significantly correlated with the time of introducing complementary food ( $p < 0.05$ ). There was a significant ( $p < 0.05$ ) decrease in the proportion of those who covered their kitchen utensils/food items as the workload increased. Heavy agricultural workload among the rural women in Ibadan significantly and negatively affects their feeding and hygiene practices and reduces the nutritional outcomes of their children. Therefore, a comprehensive nutritional program targeted at rural women and their children should be implemented.

## Keywords

Agricultural workload, Feeding practices, Nutritional status, Under-five children, Rural women

## Abbreviations

BMI: Body Mass Index; MET-hours/day: Metabolic Equivalent-hours per day

## Introduction

Child malnutrition, a widely spread disorder in tropical and subtropical areas has a long-lasting effect and had been attributed to child mortality, morbidity, poor physical growth, and cognitive development into adulthood [1,2]. It is not a simple matter of whether the child has eaten enough food or not since a child who eats enough to satisfy immediate hunger can still be malnourished. Malnutrition, a pathological condition caused by the inadequacy or over consumption of one or more of the essential nutrients affects all levels of development, either physically, mentally, socially, psychologically, and physiologically. If not addressed, it

could lead to or multiply the development of diseases and chronic health conditions with high mortality [3,4]. The most critically vulnerable groups are the developing foetus, preschool children, women before and during pregnancy, and lactating women [5,6].

In contrast to acute malnutrition which is connected with an immediate crisis such as periodic food shortages, chronic malnutrition is attributable to inadequate nutrition over a prolonged period resulting from poverty, chronic food shortages, poor feeding practices, and repeated episodes of health problems (such as infections) or poor health services and an unhealthy environment [7,8]. Causes of malnutrition are complex, multidimensional, and interrelated. Globally, the challenge of malnutrition remains troubling. For children younger than age 5, 22 percent are stunted, or are too short for their age; 7 percent are moderately and severely wasted - too thin for their height, and 6 percent are moderately and severely overweight [4]. Good and adequate nutrition is the bedrock of child survival and development. Well-nourished children are better able to grow, play, learn, and participate in their communities and are more resilient in the face of crisis. A report by Black, et al. [9] indicates that 165 million of all children under 5 years worldwide are stunted and a further 52 million are wasted with Africa and Asia having the highest burden. Although, this figure has reduced, yet, many children are not getting the nutrition they need to survive and thrive. This is especially true for the poorest and most vulnerable children [4].

At least one in three children under 5 is affected by malnutrition in its most visible forms: Stunting, wasting, and overweight [4]. Some 144 million under the age of 5 are too short for their age (stunting), and their brains may never develop to their full cognitive potential, hindering their ability to learn as children, earn as adults, and contribute fully to their societies. Wasting affects 47 million children globally. Although, these figures have reduced, yet, many children are not getting the nutrition they need to survive and thrive. This is especially true for the poorest and most vulnerable children [4]. Children with wasting are desperately thin, have weakened immune systems, and face an increased risk of death: They require urgent treatment and care to survive. In sub-Saharan Africa, the prevalence of stunting is declining but remains over 30%. Nigeria has the second highest burden of stunted children in the world, with a national prevalence rate of 32 percent of children under five [4,10], and with many states in the northwest and north east recording prevalence above 40 percent - the WHO critical levels [10]. Stunting, therefore, remains the largest burden, indicating a long-term nutritional problem in the country as is in the Sub-Saharan region (37 percent). An estimated 2 million children in Nigeria suffer from severe acute malnutrition (SAM), but only two out of every 10 children affected

are recurrently reached with treatment [4].

One of the key underlying causes of childhood malnutrition is inadequate care including poor child feeding (IYCF) practices. The peculiar feeding processes include breastfeeding (generally exclusive between 0-6 months), complementary feeding (6-9 months), and the introduction of normal adult family diets. Any failure in the feeding pattern at these vulnerable and critical stages in life may endanger subsequent nutritional status in later life [9,11]. Sreedhara, et al. [12] added that it can lead to stunted growth, delayed motor and mental development, immune incompetence, increased risk of infectious diseases such as diarrhea, and development of non-communicable diseases in later life. Optimum child care is manifested in the way a child is fed, nurtured, socialized, and guided. It is mainly practiced by women who carry out many of the care activities such as pre-conception care and during pregnancy; breastfeeding and feeding of young children; psychosocial stimulation of children and support for their development; complementary feeding; hygiene practices and care for a child during illness and adoption of health seeking practices. Therefore, it can be said that child survival, growth, and development depend not only on food intake and health but also on care behaviors as shown by the extended UNICEF (1990) model of care [13,14].

Reasonable workload by the caregiver and adequate time availability among other factors has been identified as central to care practices of the caregiver [15,16]. Nevertheless, little attention has been paid to the relationship between the economic characters of the child's caregiver, usually the mother, and the child's health and nutrition. An increasing number of women engage in different types of work outside their homes. Meeting these work demand increases their workload and cuts into their time - a finite resource essential for ensuring well-being [17] and affects not only their food intake but also the quality of care offered to their children [18,19]. In affluent societies, the burden of combining economic activities with the traditional role of homemakers is lessened by the availability of day-care centres, domestic appliances, and other social amenities. However, such facilities are not available or affordable in poorer settings [18]. The situation is even pathetic in regions where societal norms and sex discrimination have forcefully subjected women to satisfy the health and nutritional needs of their families while compromising their own needs. Women are, thus, vulnerable to malnutrition for social and biological reasons [19]. It is abundantly clear especially in sub-Saharan Africa, that women are overburdened with food-securing activities, and the time constraints of women devote to child care have been identified as hindrances to the success of some nutritional interventions [20]. Therefore, this study was

carried out to examine the constraints of workload in agricultural food production on children's nutritional status, feeding, and hygiene practices among rural women in Ibadan, Nigeria. Agricultural Food production in this study cut across cultivating, harvesting, and other related agricultural food production activities. It does not involve the transformation of food, sales, or service of food directly to the public.

The information from this work would help to illuminate policy and program strategies aim at improving family nutrition outcomes, especially among women and their vulnerable children in the rural areas of developing countries like Nigeria. Additionally, a better understanding of the constraint of women's workload on their childcare practices and consequent nutrition outcomes among the primary food producers is vital in planning rural food and nutrition policies.

## Methodology

This cross-sectional study was carried out to examine the constraints of workload in agricultural food production on children's nutritional status, feeding, and hygiene practices among rural women in Ibadan, Nigeria. Multi-stage sampling technique was employed to select each household and 217 mother-child pairs from agrarian communities of Ido and Akinyele Local Government Areas of Ibadan, Oyo State, Nigeria was selected for the study. A pre-tested, interviewer-administered, semi-structured questionnaire developed in English and translated to the local language (Yoruba) was used to collect data on household and sociodemographic characteristics of mothers, and personal characteristics of under-five children of the women. Information on mother's child feeding practices was obtained using the programme guide for Infant and Young Child Feeding and information on hygiene practices was also obtained.

### Mother's agricultural workload

A 24-hour physical activity recall was obtained to assess the workload of mothers in all activities and energy expenditure was determined using the Compendium of Physical activity [21,22] and expressed in Metabolic Equivalent-Hour per day (MET-Hour/day). The workload in agricultural food production activities was identified and separated from the non-farming activity and categorized as light ( $\leq 20$ ), moderate ( $> 20-40$ ), and heavy ( $> 40$ ) MET-hours/day. The number of hours spent in agricultural activity was also determined [23].

### Physical examination under-five children

Length/Height (cm), weight (kg) and age (months) were taken and anthropometric indices such as weight-for-height, height-for-age and weight-for-age, were derived for under-five children using WHO Anthro software.

## Data processing and analysis

Data were cleaned and verified for accuracy. Statistical analysis was done using SPSS software version 20.0. Data were summarized using descriptive statistics such as mean, frequency tables and percentages. Inferential statistics such as Chi-Square test and correlation were used to determine statistical differences and associations between variables. Level of statistical significance was set at  $p < 0.05$ .

## Ethical considerations

Ethical approval was obtained from University of Ibadan/University College Hospital Institutional Review Board (IRB), from the Local Governments where the

**Table 1:** Socio-demographic characteristics of the rural mothers and their children.

Variable	Frequency	Percentage
<b>Age (years) Mean = 32.32 ± 6.20 (min = 20, max = 52)</b>		
20-30	96	44.2
31-40	102	47.0
41-55	19	8.8
<b>Marital Status</b>		
Married	208	95.9
Widowed	9	4.1
<b>Mothers' level of education</b>		
No formal education	135	62.2
Primary Education	65	30.0
Post primary education	11	5.1
Complete secondary education	6	2.8
<b>Main Occupation</b>		
Farmer	209	96.4
Artisan	4	1.8
Petty Trader	4	1.8
<b>Sex of Children</b>		
Male	129	59.4
Female	88	40.6
<b>Children's age (Months)</b>		
0-11	6	2.8
12-23	58	26.7
24-35	55	25.3
36-47	52	24.0
48-59	46	21.2
<b>Place of Delivery</b>		
At Home	117	53.9
Clinic/Maternity	95	43.8
Mission House	4	1.8
TBA Centre	1	0.5
Total	217	100

research was carried out. Inform consent was obtained from community leaders, each family head and the mothers.

## Results

As presented in Table 1, the mothers' age ranged from 20 to 52 years with a mean age of  $32.32 \pm 6.20$  years. Almost half (47.0%) of the mothers were ages 31 to 40 years Majority (95.9%) were married. More than half, (62.2%) of the women had no formal education, and only 2.8% completed their secondary education. More than half 129 (59.4%) of the children aged 0-59

**Table 2:** Workload of the women in agricultural food production in Ibadan.

Variable	Frequency	Percentage
<b>Workload in MetHours Per Day (Mean workload <math>34.4 \pm 10.1</math> MET-Hours/day)</b>		
0.01-20.00 (Light)	19	8.8
20.01-40.00 (Moderate)	127	58.5
40.01-60.00 (Heavy)	71	32.7
<b>Hours of Work Per Day</b>		
1.0-5.0 (Light)	27	12.4
5.1-8.0 (Moderate)	110	50.7
8.1-12.0 (Heavy)	80	36.9
Total	217	100

months were male while 88 (40.6%) were female with mean age of  $35.33 \pm 14.07$  months. Only 6 (2.8%) were infants, and more than half (53.9%) of the mothers delivered the index child at home.

The workload of the women in agricultural food production in this study indicated in Table 2 shows that the workload of 127 (58.5%) of the respondents were moderate while 71 (32.7%) had heavy workload. Similarly, using hours of work per day 110 (50.7%) had moderate workload while 80 (36.9%) had heavy workload. The nutritional anthropometric in Table 3 indicated that 30.4% of the children were underweight with 5.5% being severely underweight, 40.5% were stunted with 19.8% severely stunted while 7.8% wasted with 3.7% severely wasted.

The correlation coefficient of the association between the mother's agricultural workload and the nutritional status of their under five children presented in Table 4 shows that the children nutritional status was negatively correlated to the mother's agricultural workload and this association was significant ( $p < 0.05$ ).

Table 5 presents the feeding practices of mothers in agricultural food production in Ibadan. Concerning the timely initiation of breastfeeding, only 37 (17.1%) of the mothers reported initiating breastfeeding within one hour after birth of the index child and 65 (30.0%) initiated

**Table 3:** Nutritional Status of under-five children of mothers in agricultural food production.

Variables	Frequency	Percentage
<b>Child Weight for age (WAZ)</b>		
Moderate underweight ( $< -2Z$ -Score)	54	24.9
Severe Underweight ( $< -3Z$ -Score)	12	5.5
Not Underweight	151	69.6
<b>Mean score = <math>-1.247 \pm 1.23</math></b>		
<b>Child Height for age (HAZ)</b>		
Moderate Stunting ( $< -2Z$ -Score)	45	20.7
Severely Stunting ( $< -3Z$ -Score)	43	19.8
Not Stunted	129	59.5
<b>Mean score = <math>-1.744 \pm 1.50</math></b>		
<b>Child Weight for Height (WHZ)</b>		
Moderate Wasting ( $< -2Z$ -Score)	9	4.1
Severe Wasting ( $< -3Z$ -Score)	8	3.7
Not Wasted	200	92.2
<b>Mean score = <math>-0.233 \pm 1.32</math></b>		
<b>Total</b>	<b>217</b>	<b>100</b>

**Table 4:** Mother's agricultural workload and the nutritional status of their children.

Children Nutritional Status	Women's agricultural workload			
	Mean	Std Deviation	r-value	P-Value
<b>Underweight</b>	34.44	10.15	-0.113	<b>0.048</b>
<b>Stunting</b>	34.44	10.15	-0.128	<b>0.030</b>
<b>Wasting</b>	34.44	10.15	-0.036	0.297

breastfeeding of the index child after one day of birth. Of all the 217 mothers, almost all 210 (96.8%) reported giving water or other liquid and semi-solid substances to their children before reaching age of 5 months while only 7 (3.2%) practiced exclusive breastfeeding. Looking at indicator of continued breastfeeding of children age range 12-23 months, out of 44 children in that age range 30 (68.2%) were reported to received breast milk in the previous day from their mothers while 14 (31.8%) did not. Forty-seven percent of the mothers reported introducing complementary foods to their children at

less than age 4 months while less than half 90 (41.5%) introduced complementary foods at age 6 months and above. The acceptable minimum dietary diversity of children age 6-23 months was observed in 32 (68.1%) of the children while more than one-quarter 15 (31.9%) of the children did not satisfied their minimum dietary diversity. All the children 47 (100.0%) were observed to satisfy their minimum meal frequency of 3 times per day while 32 (68.1%) of the children satisfied their minimum acceptable diet.

**Table 5:** Core indicators of feeding practices of mothers in agricultural food production in Ibadan.

Variables	Frequency	Percentage
<b>Breastfeeding initiation after birth</b>		
Within one hour	37	17.0
2-5 hours	98	45.2
6-10 hours	17	7.8
After one day	65	30.0
<b>Exclusive breastfeeding practices</b>		
Yes	7	3.2
No	210	96.8
<b>Continued Breastfeeding from 12-23 months</b>		
Yes	30	68.2
No	14	31.8
<b>Introduction of Complementary foods</b>		
< 4 months	47	21.7
4-5 months	77	35.5
≥ 6 months	90	41.5
Don't Know	3	1.4
<b>Minimum Dietary Diversity N = 216</b>		
< 4 Food Groups	55	25.5
≥ 4 Food Groups	161	74.5
<b>Minimum Dietary Diversity (Age 6-23 months) N = 47</b>		
< 4 Food Groups	15	31.9
≥ 4 Food Groups	32	68.1
<b>Minimum meal frequency (Age 6-23 months) N = 47</b>		
3 Times	27	57.4
≥ 4 times	20	42.6
<b>Minimum Acceptable Diet (Age 6-23 months) N = 47</b>		
Yes	32	68.1
No	15	31.9

Observed hygiene practices of the women food producers presented in Table 6 shows that more than half 100 (59.9%) of the mothers did not cover their utensils or food items while 67 (40.1%) were observed to cover their utensils or food items. Of the 169 households observed, 48 (28.4%) kept their kitchen floor clean, 121 (71.6%) have the floor of the kitchen littered and less than half 70 (32.3%) out of 217 of the household had barrier against animal in their houses. Of the 192 households observed, only 55 (28.6%) were observed to have covering on their sources of water while 137 (71.4%) of the household were drinking water from water source that are not covered. 176 (81.1%) of the household were littered with dirty substance while 41 (18.9%) were observed not to be soiled with dirty paper or leaves around the house. Of all the 217 household

**Table 6:** Hygiene Practices of the mothers in agricultural food production in Ibadan.

Variables	Frequency	Percentage
<b>Kitchen Utensil/Food items covered N = 167</b>		
Yes	67	40.1
No	100	59.9
<b>Presence of dirty on kitchen floor N = 169</b>		
Yes	121	71.6
No	48	28.4
<b>Presence of barrier against domestic animal</b>		
Yes	70	32.3
No	147	67.7
<b>Source of water covered N = 192</b>		
Yes	55	28.6
No	137	71.4
<b>Presence of dirty paper/leaves around house</b>		
Yes	176	81.1
No	41	18.9
<b>Child uses diaper</b>		
Yes	6	2.8
No	211	97.2
<b>Presence of toilet N = 217</b>		
Yes (Pit)	4	1.8
No	213	98.2
<b>Presence of water drainage system</b>		
No	217	100

surveyed, only 4 (1.8%) had pit latrine the majority (98.2%) of the households had no toilet but defecate in nearby bushes. No house had any drainage system.

Table 7 presented the association between the workload and child feeding practices of the women farmers studied in Ibadan. Breastfeeding Initiation was observed to be positively and significantly correlated with hours of work of the women in agricultural activities  $p < 0.05$ . In addition, mothers' hours of work negatively and significantly correlated with time of introducing complementary food to their under-children  $p < 0.05$ .

The association between mothers' agricultural workload and selected hygiene practices variables presented in Table 8 revealed that presence of dirty materials on the kitchen floor and around the house increases with elevated workload although this was not statistically significant. Additionally, the proportion of those who covered their kitchen utensil/food items drops as workload increases and this relationship was statistically significant ( $p < 0.05$ ).

## Discussion of Findings

This study thus presents further evidence about the

**Table 7:** Agricultural workload and feeding practices of the women farmers in Ibadan.

Variables	Workload	r- Value	p- Value
Breastfeeding Initiation	MetHours	0.128	0.059
	Hours of work	0.149	0.029
Introduction of complementary food	MetHours	-0.035	0.605
	Hours of work	-0.137	0.044
Minimum Dietary Diversity	MetHours	0.103	0.130
	Hours of work	0.047	0.494

**Table 8:** Mothers' agricultural workload and hygiene practices variables.

Workload (MetHours/day)	Kitchen Utensil/Food Items Covered N = 167			Chi-Square (X <sup>2</sup> )	P-value
	Yes	No	Total		
Light	7 (70.0)	3 (30.0)	10	6.577	0.037
Moderate	43 (43.0)	57 (57.0)	100		
Heavy	17 (29.8)	40 (70.2)	57		
Total	67	100	167		
Workload (MetHours/day)	Presence of dirty materials on the kitchen floor N = 169			Chi-Square (X <sup>2</sup> )	P-value
	Yes	No	Total		
Light	5 (45.5)	6 (54.5)	11	3.958	0.138
Moderate	74 (73.3)	27 (26.7)	101		
Heavy	42 (73.7)	15 (26.3)	57		
Total	121	48	169		
Workload (MetHours/day)	Well or source of water covered N = 192			Chi-Square (X <sup>2</sup> )	P-value
	Yes	No	Total		
Light	3 (20.0)	12 (80.0)	15	1.225	0.542
Moderate	30 (27.3)	80 (72.7)	110		
Heavy	22 (32.8)	45 (67.2)	67		
Total	55	137	192		
Workload (MetHours/day)	Dirty materials in and around the house			Chi-Square (X <sup>2</sup> )	P-value
	Yes	No	Total		
Light	14 (73.7)	5 (26.3)	19	4.202	0.122
Moderate	99 (78.0)	28 (22.0)	127		
Heavy	63 (88.7)	8 (11.3)	71		
Total	176	41	217		

relationship between the economic character of the child's caregiver, usually the mother, and the child's health and nutrition. It was observed that more than half of the mothers were within the age range of 31-40 years and many (62.2%) of the women had no formal education. The respondents' level of education result was higher than the report of Banmeke and Ajayi [24] among women farmers in southwest-western, Nigeria. The disparity may be related to the study location of that survey. However, the low level of education among the women was similar to studies conducted in rural areas of Benue State where more than half had no formal education [25]. Dawit, et al. [26] equally opined that in Ethiopia most of the women in rural areas have no formal education.

More than half (59.4%) of the children were male, 40.6% were female and their mean age was  $35.33 \pm 14.07$  months. Many (53.9%) of the mothers delivered the index child at home. The agricultural workload of the women farmers measured as energy expenditure in MetHours per day indicated that a third (32.7%) of the women farmers had heavy, more than half (58.5%) moderate, and few (8.8%) had light workloads. Workload based on the number of hours spent in the field per day, also revealed that 36.9%, 50.7%, and 12.4% had heavy, moderate, and light agricultural workloads respectively. Fabusoro, et al. [23] in a study carried out in Ogun State, Nigeria indicated that rural women food producers have a heavy workload, working an average of 13 hours per day. The nutritional anthropometry of the under-five children of the mothers in the rural areas studied shows that the mean weight-for-age, height-for-age, and weight-for-height Z-scores were -1.247, -1.744, and -0.233 respectively. Thirty percent of the children were underweight (5.5% severe), 40.5% stunted (19.8% severe) and 7.8% wasted (3.7% severe).

Using the WHO Child Growth Standards, it means that 40.5% of under-five children in the study area were suffering from chronic malnutrition. The prevalence of stunting in this study is however higher than the national average of 37% reported by the Nigeria Population Commission [27] in the 2018 Nigeria Demographic and Health Survey (NDHS) but similar to the 42% reported by Maziya-Dixon, et al. [28] in the Nigeria Food Consumption and Nutrition Survey and 43.3% reported by Senbanjo, et al. [29]. However, the severity of stunting in this study (19.8%) is fragmentally higher than what was reported in the National Survey (17.0%). The disparity in the level of stunting in this study from the National Survey may be due to sampling of the National Survey which included both rural and urban areas. Thus, the National Survey report highlighted that rural children were more likely to be stunted than urban children (46 percent compared with 27 percent) [27]. The prevalence of underweight children in this study is similar to the national average of 29%, while the percentage of wasted children is slightly lower than the

national average of 9.2%. Al-Sadeeq, et al. [30] in a study among under-five children in rural Yemen reported that 55.1% of the children were underweight, 38.5% stunted and 39.9% wasted. However, the reported children's nutritional anthropometry of this study is lower when compared to the observed nutritional status of children in Nasarawa State, Nigeria [31] which reported a prevalence of 53.3% underweight, 75.7% stunting, and 19.1% wasting.

Relating the mother's agricultural workload to the nutritional status of the under-five children in this study indicated that stunting in the under-five children increased as their mother's workload increased. In addition, the correlation coefficient shows that the agricultural workload of mothers had a significant negative effect on height-for-age and weight-for-age ( $p < 0.05$ ). According to Save the Children [32], it was shown that in most developing countries, the nutritional status of under-five children is compromised by the cumulative and synergistic effects of many risk factors which include limited access to food, lack of power at the household level, and the mother's time and energy demand. Similar studies [23,33] have reported that the long-time mothers spent in farming activities was a significant risk factor for growth among their under-five children.

Interestingly, all mothers reported having breastfed their children after birth, however, only a few of the mothers claimed to put their infants to the breast within one hour after delivery. Mothers who initiated breastfeeding within one hour were 17.1% while majority (82.9%) did after one hour. This observation is lower compared to 36.7% of mothers who initiated breastfeeding within one hour after birth as reported by Subedi, et al. [34] in rural Chepang communities of Nepal. The breastfeeding practices of the mothers in this study was very poor because from birth to 4-6 months of life, breast milk should be the sole or prime source of nutrients and optimal breastfeeding practice becomes a critical factor in child survival and development [35]. Breast milk contains all nutrients, antibodies, hormones, and antioxidants that an infant needs to thrive. Early initiation within half an hour of birth will ensure that the protective antibodies in the colostrum are available rapidly to the infant because, after 24 to 48 hours, the level of antibodies in breast milk diminishes [36].

Regarding exclusive breastfeeding practices up to six months, a very small proportion 3.2% of these mothers practiced it. Three out of 100 under-five children in this study area were given only breastmilk (not even water) until the age of six months. These may not be unconnected with a lack of adequate time due to a heavy workload and perhaps poor information on breastfeeding practices. The proportion of mothers practicing exclusive breastfeeding in this study is lower compared to the reported national average of

29% [27]. Infrastructures inaccessibility may also be a factor in the childcare practices of the women as more than half (53.9%) of them delivered their index child at home either on their own or with help of traditional birth attendants but in absence of trained nurses and midwives.

In this study, about a quarter introduced complementary foods to their under-five children before they reach age 4 months. Similarly, in a study among low-income earners in a South-Western, Nigerian Community. It was reported that complementary feeding was introduced by 38.7% of the mothers to their infants at less than 4 months, 37.3% between 5-6 months, and 24% at 6 months of age [37]. However, this study contradicts Subedi, et al. [34] who reported that 90.0% of the mothers initiated complementary feeding at the age of 6 months in a study carried out in rural Chepang communities of Nepal.

More than half of the respondents did not cover their utensils or food items, 71.4% of the households were drinking from water sources that were not covered and many drank water from the stream and some (41.0%) from well, some of which were not covered. The observation in this study differs from 63.5% of households that drank from well and 3.5% from stream reported by Lawal and Samuel, [38] and that may be due to the nearness of the farming households they studied to the town. Very few have pit latrines, while the majority of the households had no toilet facility but defecate openly in nearby bushes. Similarly, in a rural agricultural Community of Varanasi, India, it was reported that many of the households have no toilet facility but defecate in an open field [39]. In the rural areas of Doti District, Nepal, children's faeces were found open as 48.2% of households has no toilet facility, and this aid the growth of house fly and easy transmission of disease [40].

There was a positive and statistically significant ( $p = 0.029$ ) relationship between breastfeeding initiation and the agricultural workload of the women respondents. The heavier the workload of the mothers is, the longer it will take them to start breastfeeding their babies. A negative and statistically significant ( $p = 0.044$ ) relationship was observed between introduction of complementary food and the agricultural workload of the rural mothers. The heavier the workload of the mothers is, the earlier they introduce family foods to their infants. Similarly, in a qualitative study of primary caregivers in rural Uganda, one of the barriers to infant and child-feeding practices reported was the heavy workload of the women [41]. In the same vein, a study carried out in the Bolivian Andes reported that heavy agricultural workload is one of the major barriers to improving child-feeding practices [42].

The presence of dirty materials on the kitchen floor and around the house increases with elevated

workload although this was not statistically significant. Nevertheless, this implies that the mother's heavy agricultural workload could be a barrier to promoting household hygiene practices which is essential for disease prevention and healthy living. The proportion of those who covered their kitchen utensil/food items drops as workload increases and this relationship was statistically significant ( $p < 0.05$ ).

## Conclusion and Recommendations

This study identified that the agricultural workload in MetHours per day in a third of the women farmers was heavy, about half moderate and few had a light agricultural workload. The heavy agricultural workload of the rural women in the agrarian communities of Ido and Akinyele Local Government Areas of Ibadan, Oyo State, Nigeria significantly and negatively affects their feeding and hygiene practices and compromises the nutritional outcomes of their under-five children.

Therefore, a comprehensive evidence-based nutritional intervention targeted at rural women and their children should be implemented. Women in the rural areas of Nigeria should promote optimum workload, be encouraged to and embrace adult education, which should include farming education. The provision of infrastructures that can stimulate good business environments such as electricity, water, good roads, and accessible market should be implemented by all tiers of government to enhance diversification of means of livelihood to alleviate poverty among rural households. This is important because involvement in non-farming activities could help to alleviate poverty because of their ability to earn good income from these activities.

Even though, this study was limited to 2 vast local government areas of Ibadan, Oyo State, Nigeria, the findings can be generalized to the broader rural communities in many parts of Nigeria and Sub-Saharan Africa. Further cross-sectional and comparative research work with a larger sample frame is needed not only in giving fresh look into the subject but to also identified other risk factors of child malnutrition to achieve optimum childcare practices, especially in the rural areas of developing countries.

## Conflicts of Interest

The authors declare no conflict of interest with respect to the research, authorship, and/or publication.

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## Authors' Contributions

The two authors, Ope Zacchaeus Adeyanju and Grace T. Fadupin devised the main project ideas, supervised the data collection in the field, data entry and analysis. The two authors discussed the results and were involved in revising of the manuscript.

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