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RESEARCH ARTICLE

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Anthropometric Changes among Women of Reproductive Age Using Contraceptives in Nyeri County, Kenya: A Six-Month Prospective Study

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ABSTRACT

Nutritional status is a vital determinant of reproductive health among women of reproductive age (WRA), yet limited data exist on how hormonal contraceptive use influences anthropometric outcomes in African populations. This study assessed changes in body mass index (BMI), waist circumference (WC), and weight among WRA in Nyeri County, Kenya, using hormonal, non-hormonal, or no contraceptives. A six-month prospective study was conducted among 114 women of reproductive age (18–49 years) at baseline, with 104 completing follow-up. Participants were categorized as hormonal users, non-hormonal users, or non-users. Anthropometric measures (weight, BMI, waist circumference) were assessed using World Health Organization protocols. Data were analyzed using paired t-tests, ANOVA, and multivariate linear regression controlling for dietary diversity and physical activity. At baseline, 68.3% of women used contraceptives (36.0% hormonal, 32.5% non-hormonal). Hormonal users gained an average of 1.18 kg (95% CI: 0.04–2.32; p = 0.043) and 0.52 kg/m² BMI (95% CI: 0.03–1.01; p = 0.038) compared to non-users, after adjusting for confounders. Waist circumference changes were non-significant. Obesity prevalence by BMI rose marginally from 29.8% to 30.8%, while WC-based obesity increased from 34.6% to 37.5%. These findings suggest marginal associations that did not remain significant after adjustment for multiple comparisons. Hormonal contraceptive use was independently associated with modest increases in weight and BMI over six months though not significant. These findings support integrating routine anthropometric monitoring into family planning services and counseling women on lifestyle modifications to mitigate weight-related concerns.

Keywords: Women of reproductive age, anthropometry, BMI, waist circumference, contraceptive use, Kenya, nutritional status, family planning

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INTRODUCTION

Nutritional status is fundamental to women's health and reproductive outcomes, influencing fertility, pregnancy, and long-term non-communicable disease (NCD) risk (World Health Organization (WHO), 2016). Anthropometric measures such as body mass index (BMI) and waist circumference (WC) are widely used to assess nutrition-related health risks, including overweight, obesity, and central adiposity (WHO, 2008). Globally, more than 1.1 billion women rely on modern contraception, with hormonal methods being among the most common (United Nations, 2019). In Kenya, the modern contraceptive prevalence rate (mCPR) among married women is estimated at 58% (Ministry of Health, 2019), with injectables and implants dominating.

While contraceptive use is vital for reproductive autonomy and maternal health, hormonal methods may exert metabolic effects that influence weight and fat distribution (Abbey B. & Rahman, 2009; Kohn et al., 2015). Evidence on the relationship between hormonal contraceptive use and anthropometric changes is mixed. Some studies report weight gain and increased adiposity, particularly with progestin-only injectables such as depot medroxyprogesterone acetate (DMPA) (Gallo et al., 2016). Others find no significant association, suggesting effects may depend on duration of use, individual metabolic response, and confounding factors such as diet and physical activity (Kohn et al., 2015).

Despite these debates, there is limited evidence from sub-Saharan Africa, where rising obesity rates intersect with high contraceptive uptake. This study addresses this need by examining anthropometric trends among WRA in Nyeri County, Kenya, comparing hormonal users, non-hormonal users, and non-users over six months. Findings aim to inform nutrition-sensitive family planning programs. This study therefore aimed to assess nutritional status using anthropometric indicators (weight, BMI, waist circumference) among WRA in Nyeri County, Kenya, comparing baseline and six-month follow-up data across contraceptive groups.

METHODS

Study Design and Setting

This was a prospective cohort (repeated-measures) study conducted in Kamakwa Ward, Nyeri County, Kenya, an urban setting with high contraceptive uptake and double burden of malnutrition (Kenya National Bereau of Statistics (KNBS), 2023).

Sample Size Determination

The required sample size was estimated using Cochran's formula with the following assumptions: expected prevalence of contraceptive use 58% (KNBS, 2023), confidence level 95% (Z = 1.96), margin of error 5%, and 10% attrition allowance. The minimum calculated sample was 114 at baseline, of whom 104 completed endline assessments (attrition rate = 9%).

Study Population and Sampling

The study targeted non-pregnant, non-lactating women of reproductive age (18–49 years) residing in Kamakwa ward. A multistage sampling technique was applied. Eligible participants were categorized into three groups based on contraceptive use: Hormonal users (injectables, implants, oral pills; n = 35 at endline), non-hormonal users (IUDs, condoms; n = 36) and not on contraceptives (n = 33). Women were excluded if they were pregnant, lactating (with infants <1 year), had chronic illnesses, or did not provide consent. A total of 119 women were initially recruited. However, five participants were excluded from the final analysis. Of these, 114 completed baseline assessment using anthropometric measurements, and 104 completed the endline at six months, resulting in a 9% attrition rate.

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Data Collection Procedures

Anthropometric data were collected following WHO (2008) protocols; Weight and height were measured twice using calibrated Seca digital scales and Holtain stadiometers, respectively; the mean values were used to compute Body Mass Index (BMI) as weight (kg)/height (m^2). Waist circumference (WC) was measured using a nonstretchable Lufkin tape at the narrowest point between the lower rib and iliac crest after normal exhalation. Instruments were standardized and recalibrated after every five measurements. Physical activity levels were assessed using the WHO Global Physical Activity Questionnaire (GPAQ), and categorized based on Metabolic Equivalent Task (MET) thresholds. Dietary diversity was assessed using the Minimum Women's Dietary Diversity Score (WDDS), based on a 24-hour dietary recall. Participants were contacted monthly to monitor contraceptive compliance and side effects. A mid-point (3-month) physical check-in was conducted, but primary outcome data (nutrition status) were collected at baseline and at the 6-month mark. All data were collected using trained research assistants and entered into Kobo Collect for secure storage.

Data Analysis

Data were analyzed using SPSS Version 25. Descriptive statistics summarized demographic and socioeconomic characteristics. Paired t-tests were used to assess within-group changes from baseline to endline. Chi-square (χ^2) tests and ANOVA were used for categorical and continuous group comparisons, respectively. Multivariate linear regression was conducted to assess the relationship between contraceptive type and changes in anthropometric indicators (weight, BMI, and waist circumference), controlling for physical activity level and dietary diversity score (DDS). Model assumptions, including normality of residuals and absence of multicollinearity were tested and satisfied. Variance inflation factors (VIFs) were below 2 for all variables. Statistical significance was set at $p < 0.05$.

Ethical Considerations

Ethical approval was obtained from Kenyatta University Ethical Review Committee (Approval Number: PKU2568/11694). Research permits were issued by the National Commission for Science, Technology, and Innovation (NACOSTI: Permit No. NACOSTI/P/22/18201). Informed consent was obtained from all participants in either English or Kiswahili. COVID-19 prevention protocols including masking, physical distancing, and equipment sanitization were strictly adhered to.

RESULTS

Demographic and Socioeconomic Characteristics

The mean age of participants was 26.01 ± 7.46 years, with 46.2% aged 20–29 years. Most participants (50.9%) were married, and 49.1% had primary education. The majority (78.9%) earned less than Ksh. 20,000 per month (Table 1).

Table 1:
Demographic and Socioeconomic Characteristics of Study Women

Variable	Baseline		Endline		χ2 p-value
	N=114	%	N=104	%	
Mean age (yrs)	26.01±7.46		26.20±7.58		0.967
Age (yrs)					
20-29	53	46.2	49	47.2	
30-39	40	35.1	36	34.6	
40-49	21	18.4	19	18.3	
Education level					0.986
Primary	56	**49.1**	50	48.1	
Secondary	47	41.2	44	42.3	
Tertiary/college/university	11	9.6	10	9.6	
Occupation					0.948
Farmer	11	9.6	12	11.5	
Casual labor	53	46.5	44	42.3	
Salaried labor	6	5.3	4	3.8	
Business	34	29.8	33	31.7	

Student	1	0.9	2	1.9	
Housewife	9	7.9	9	8.7	
Respondent monthly income					
No income	6	5.3	6	5.5	0.847
≤20,000	90	78.9	81	77.9	
20,001-40,000	16	14.0	15	14.4	
40,001-60,000	1	0.9	2	1.9	
≥60,001	1	0.9	0	0.0	

**Significant at p<0.05*

Contraceptive Use

At baseline, 68.4% of participants were using contraceptives, with hormonal methods (36.0%) being the most common. Hormonal methods included injectables (DMPA), combined oral contraceptive pills, and implants, while non-hormonal methods included copper intrauterine devices (IUDs) and male/female condoms. Health workers were the primary source of contraceptive information (71.8%), and government clinics were the main source of contraceptives (84.6%) (Table 2).

Table 2:

Types of Contraceptives Used by Study Women

Characteristic	Baseline		Endline		χ2 p-value
	N=114	%	N=104	%	
Number of WRA on contraceptives	78	68.4	71	68.3	0.996
Type of contraceptive used					
Injectables	12	10.5	10	9.6	0.886
Pills	13	11.4	10	9.6	
Implants	16	14.0	15	14.4	
IUD	22	19.3	22	21.2	
Male/Female condom	15	**13.2**	14	13.5	
None	**36**	**31.6**	**33**	**31.7**	
Categories of contraceptives used					
Hormonal	**41**	**36.0**	**35**	**33.7**	0.804
Non-hormonal	37	32.5	36	34.6	
No contraceptive	36	31.5	33	31.7	
Source of information on choice of contraceptives					
Self	4	5.1	3	4.2	0.136
Health-worker	**56**	**71.8**	**57**	**80.3**	
Colleagues	2	2.6	1	1.4	
Spouse	12	15.4	8	11.3	
Media	3	3.8	2	2.8	
Friends	2	2.6	2	2.8	
Main source of contraceptives					
Government clinic or hospital	**66**	**84.6**	**63**	**88.7**	

Pharmacy	4	5.1	4	5.6	0.933
Private hospitals	6	7.6	4	5.6	
General Shop	3	3.8	2	2.8	

**Significant at p<0.05*

The Nutrition Status Using Anthropometric Indicators of WRA in Nyeri County

Women using hormonal contraceptives recorded a mean weight increase of 1.6 kg (95% CI: –4.5, 7.7; p=0.612; d=0.09) and a BMI rise of 0.8 kg/m² (95% CI: –1.5, 3.1; p=0.494; d=0.12), though both changes were small and not statistically significant. Non-hormonal users showed negligible reductions in weight (–0.7 kg; p=0.825) and BMI (–0.4 kg/m²; p=0.712), with trivial effect sizes. Participants not using contraceptives exhibited a modest increase in weight (+0.9 kg; p=0.702) and BMI (+0.4 kg/m²; p=0.649), alongside a moderate but non-significant reduction in waist circumference (–4.4 cm; 95% CI: –9.3, 0.5; p=0.090; d=–0.30). Overall, effect sizes across all groups were small, indicating that the short-term anthropometric changes observed were not clinically meaningful. (Table 3).

Table 3*:*

Changes in Nutritional Status by Contraceptive Use

Group	Weight (kg)	Weight (95% CI)	p-value	Cohen's d
Hormonal	68.7 ± 18.9 → 70.3 ± 18.1	1.6 (-4.5, 7.7)	0.612	0.09
Non-Hormonal	69.7 ± 18.1 → 69.0 ± 19.6	-0.7 (-6.9, 5.5)	0.825	-0.04
No Contraceptives	68.7 ± 13.5 → 69.6 ± 13.3	0.9 (-3.7, 5.5)	0.702	0.07
	BMI (kg/m²)	**ΔBMI (95% CI)**	**p-value**	**Cohen's d**
Hormonal	26.1 ± 7.0 → 26.9 ± 6.7	0.8 (-1.5, 3.1)	0.494	0.12
Non-Hormonal	27.1 ± 6.2 → 26.7 ± 6.7	-0.4 (-2.5, 1.7)	0.712	-0.06
No Contraceptives	26.2 ± 4.9 → 26.6 ± 5.1	0.4 (-1.3, 2.1)	0.649	0.08
	Waist Circumference (cm)	**ΔWC (95% CI)**	**p-value**	**Cohen's d**
Hormonal	92.4 ± 17.7 → 91.5 ± 16.4	-0.9 (-6.6, 4.8)	0.757	-0.05
Non-Hormonal	90.9 ± 16.9 → 89.7 ± 14.7	-1.2 (-6.4, 4.0)	0.652	-0.08
No Contraceptives	93.5 ± 16.8 → 89.1 ± 11.7	-4.4 (-9.3, 0.5)	0.09	-0.3

**Significant at p<0.05*

While mean changes in weight, BMI, and waist circumference were minimal and not statistically significant across contraceptive groups, further analysis was conducted to examine shifts in nutritional status categories. Specifically, the prevalence of underweight, normal weight, overweight, and obesity, as defined by BMI and waist circumference cut-offs, was compared at baseline and endline. This categorical analysis provides additional insights into whether contraceptive use was associated with notable changes in the distribution of women across nutritional status classifications.

Nutrition Status by the Type of Contraceptive Used

The study further compared the nutritional status of participants based on the type of contraceptives used. At baseline, 8.7% of participants were underweight, 37.5% had a normal weight, 24.0% were overweight, and 29.8% were obese (Table 5). At endline, the proportions were 5.8% underweight, 34.6% normal weight, 28.8% overweight, and 30.8% obese. Regarding waist circumference, 65.4% of participants had a normal waist circumference at baseline, while 34.6% were categorized as obese. At endline, 62.5% had a normal waist circumference, and 37.5% were classified as obese. However, there were no statistically significant differences in BMI (p>0.05) and waist circumference (p>0.05) between baseline and endline (Table 5). When categorized based on contraceptive use, the proportion of underweight participants remained relatively low across all groups: 8.6% in the hormonal group, 11.1% in the non-hormonal group, and 6.1% in the no-contraceptive group. Participants with a normal BMI were 40.0% in the hormonal group, 30.6% in the non-hormonal group, and 42.4% in the no-contraceptive group. The prevalence of obesity was 31.4% in the hormonal group, 30.6% in the non-hormonal group, and 27.3% in the no-contraceptive group. In terms of waist circumference, obesity was observed in 37.1% of participants using hormonal contraceptives, 36.1% of those using non-hormonal contraceptives, and 33.3% of those not on contraceptives. There were no statistically significant differences in BMI (p>0.05) or waist circumference (p>0.05) across contraceptive groups at both baseline and endline (Table 5).

Table 5:

Comparison of Nutrition Status by the Type of Contraceptive Used

Variable	Hormonal			Non-hormonal			Not on Contraceptives		
	Baselinen (%)n=35	Endlinen (%)n=35	χ2p-value	Baselinen (%)n=36	Endlinen (%)n=36	χ2p-value	Baselinen (%)n=33	Endlinen (%)n=33	χ2p-value
Body Mass Index									
Underweight	3(8.6)	1(2.9)	0.062	4(11.1)	3(8.6)	0.061	2(6.1)	2(6.1)	0.987
Normal	14(40.0)	13(37.1)	0.072	11(30.6)	12(32.3)	0.814	14(42.4)	11(33.3)	0.054
Overweight	7(20.0)	9(25.0)	0.051	10(27.8)	11(30.6)	0.089	8(24.2)	10(30.3)	0.067
Obese	11(31.4)	12(34.3)	0.085	11(30.6)	10(27.8)	0.064	9(27.3)	10(30.3)	0.091
Waist Circumference									
Normal	22(62.9)	22(62.9)	0.976	23(63.9)	23(63.9)	0.989	22(66.7)	22(66.7)	0.934
Obese	13(37.1)	13(37.1)	0.928	13(36.1)	13(36.1)	0.875	11(33.3)	11(33.3)	0.912

**Significant at p<0.05; *BMI- Body Mass Index; *WC- Waist Circumference*

Comparative Analysis of Obesity Using Percent Body Fat, BMI, and Waist Circumference at Baseline and Endline based on use of Contraceptive

At baseline, declared obese by Body Mass Index (BMI) and Waist Circumference (WC) at 31.7% and 37.1% respectively (Table 6). There was no significant difference between the nutrition status of the participants by BMI (31.7%) and WC (37.1%) (p=0.072). At the endline, the situation remained the same in all the participants across all three tools there was no significant change in the other parameters (Table 6).

Table 6:

Analysis of obesity Using BMI, and Waist Circumference at Baseline and Endline

	WC n (%)	p-value	BMI n (%)	p-value
HormonalN=35	13(37.1)	0.067	11(31.7)	0.072
	14(40.0)		12(34.3)	
Non-hormonalN=36	13(36.1)	0.112	11(30.6)	0.126
	14(38.9)		10(27.8)	
No ContraceptiveN=33	11(33.3)	0.132	9(27.3)	0.128
	10(30.3)		10(30.3)	
TOTALN=104	36(34.6)		30(29.8)	
	39(37.5)		32(30.8)	

**Significant at p<0.05*

Multivariate Linear Regression Models Predicting Change in Anthropometric Measures by Contraceptive Type (n = 104)

The multivariate regression model (Table 7) initially suggested that hormonal contraceptive use was associated with modest increases in weight (+1.18 kg; 95% CI: 0.04, 2.32; original p = 0.043) and BMI (+0.52 kg/m²; 95% CI: 0.03, 1.01; original p = 0.038) compared to non-users, after adjusting for physical activity and dietary diversity. Waist circumference changes were not statistically significant ($p = 0.121$). Non-hormonal contraceptive use, physical activity, and dietary diversity were weakly associated with anthropometric outcomes, but none of these associations reached significance (all $p > 0.05$). However, after applying Holm-Bonferroni correction for multiple comparisons, the associations between hormonal contraceptive use and both weight (adjusted $p = 0.473$) and BMI (adjusted $p = 0.456$) were no longer statistically significant. Adjusted R^2 values indicated modest explanatory power of the models (ΔWeight = 0.18, ΔBMI = 0.15, ΔWC = 0.14).

Table 7:
Multivariate Linear Regression Models Predicting Change in Anthropometric Measures by Contraceptive Type (n = 104

Predictor Variable	ΔWeight β (95% CI)	Original p	Holm-adjusted p
Hormonal contraceptive use (ref = no use)	1.18 (0.04, 2.32)	0.043	0.473
Non-hormonal contraceptive use	0.39 (-0.85, 1.62)	0.538	1.000
Physical activity level (MET score)	-0.15 (-0.36, 0.05)	0.140	1.000
Dietary diversity score (WDDS)	-0.32 (-0.76, 0.12)	0.153	1.000
Hormonal contraceptive use (ref = no use)	**ΔBMI β (95% CI)**	**Original p**	**Holm-adjusted p**
Non-hormonal contraceptive use	0.52 (0.03, 1.01)	0.038	0.456
Physical activity level (MET score)	0.16 (-0.28, 0.60)	0.471	1.000
Dietary diversity score (WDDS)	-0.06 (-0.14, 0.02)	0.121	1.000
Hormonal contraceptive use (ref = no use)	-0.14 (-0.32, 0.05)	0.144	1.000
Non-hormonal contraceptive use	**ΔWC β (95% CI)**	**Original p**	**Holm-adjusted p**
Hormonal contraceptive use (ref = no use)	1.10 (-0.30, 2.50)	0.121	1.000
Non-hormonal contraceptive use	0.75 (-0.70, 2.20)	0.308	1.000
Physical activity level (MET score)	-0.12 (-0.30, 0.06)	0.181	1.000
Dietary diversity score (WDDS)	-0.41 (-0.89, 0.06)	0.086	1.000

Note: *Regression coefficients (β) are presented with 95% confidence intervals (CI). Original p-values are shown alongside Holm-Bonferroni adjusted p-values to account for multiple comparisons across outcomes (ΔWeight, ΔBMI, ΔWC). After adjustment, none of the associations remained statistically significant at α = 0.05. Adjusted R^2 values for the models were 0.18 (ΔWeight), 0.15 (ΔBMI), and 0.14 (ΔWC), indicating modest explanatory power.*

DISCUSSION

While our study did not detect statistically significant shifts in weight, Body Mass Index (BMI), or waist circumference (WC) over six months, subtle trends particularly among hormonal contraceptive users are consistent with broader evidence documenting modest increases in adiposity associated with hormonal methods. Hormonal contraceptives, such as injectables and implants, have been linked to metabolic changes that may promote fat accumulation and fluid retention, even within a relatively short period of use (Lopez et al., 2016). Importantly, our findings echo national-level data showing that Kenyan women who use hormonal contraception are more likely to be overweight or obese compared to non-users (approximately one-third versus one-quarter, respectively) (Robinson & Burke, 2013). This pattern reflects the nutritional transition in many LMICs, where overweight and obesity rates rise even amid persistent undernutrition, especially in semi-urban settings. The higher obesity prevalence estimated via WC compared to BMI suggests that central adiposity may be under-recognized if BMI is the sole metric. This is consistent with broader findings that shows that WC is a stronger predictor of visceral adiposity and cardiometabolic risk than BMI alone (Rosano et al., 2022; Sørensen et al., 2014). In settings like Nyeri County, where mixed nutritional problems exist, focusing on WC may help identify women at higher risk for metabolic sequelae earlier than relying on BMI thresholds.

Although obesity may raise concerns about contraceptive efficacy, evidence remains inconclusive. Some systematic reviews report that obese women may have slightly elevated (≈40% higher) risk of pregnancy with combined oral contraceptives (COCs), though absolute failure rates remain low (<1%), and the evidence is of low to moderate quality (Lopez et al., 2013). Current consensus supports the continued use of hormonal methods across BMI categories, with long-acting reversible contraceptives (LARCs) like implants and IUDs preferable where feasible, as efficacy is generally unaffected by obesity status (Robinson & Burke, 2013; Lopez et al., 2016). From a safety perspective, overweight and obese women using combined hormonal contraceptives face elevated risks for thromboembolism risks that escalate sharply with higher BMI (≥30 kg/m²), potentially increasing thrombosis risk by up to 10-fold compared to non-obese non-users (Rosano et al., 2022). In contrast, progestogen-only methods and non-hormonal options carry lower thrombotic risk and may be preferable for obese women.

In multivariate analysis adjusting for physical activity and dietary diversity, hormonal contraceptive users experienced modest increases in weight and BMI compared to non-users. This finding aligns with evidence from Malaysia, where women using hormonal methods (especially injectable contraceptives such as Depo-Provera) gained significantly more weight (adjusted mean difference ~2.85 kg) than non-hormonal users, even after controlling for confounders (Agyapong et al., 2020; Ibrahim et al., 2019). Systematic reviews also suggest progestin-only and combined hormonal methods may contribute to small increases in fat mass and fluid retention over 6–12 months of use (Ibrahim et al., 2019), though evidence quality is variable. Importantly, waist circumference changes were not statistically significant. The consistent central obesity prevalence observed detected by WC rather than BMI reinforces the role of WC as a more sensitive metric for visceral fat and metabolic risk, consistent with existing literature (Agyapong et al., 2020; Mkuu et al., 2018).

Our adjustments for physical activity and dietary diversity, though not statistically significant predictors in regression analyses, underscore their potential influence on body composition. Studies in Ghana and Ethiopia have demonstrated that low dietary diversity and physical inactivity are significantly associated with central obesity. For instance, in Ethiopia, consuming a less diversified diet and insufficient physical activity were associated with over twice the odds of abdominal obesity(Tesfaye et al., 2020). Similarly, in Ghanaian adults, physical inactivity and unhealthy dietary patterns were positively linked to BMI and central adiposity, emphasizing the need for lifestyle context in contraceptive-related weight change (Agyapong et al., 2020). The results echo national survey findings showing that approximately one in three Kenyan women are overweight or obese, with higher risk among hormonal contraceptive users (Mkuu et al., 2018). This reinforces a broader regional trend toward obesity despite ongoing challenges of undernutrition. Such dual burdens necessitate integrated interventions addressing reproductive health and nutrition outcomes simultaneously.

Conclusions

The study demonstrated no significant relationship was found between contraceptive use and overall nutritional status as measured by BMI, weight, or waist circumference. Although the changes were not statistically significant across all indicators, there were notable trends towards increased adiposity, particularly among hormonal contraceptive users. From a public health perspective, even modest increases (≈1 kg in weight and 0.5 kg/m² in BMI over six months) could become important if sustained over years, particularly in populations where obesity prevalence is already rising. Thus, while our study cannot confirm a statistically significant association, the observed trends highlight the value of incorporating routine anthropometric monitoring into family planning services and counseling women on lifestyle practices that may mitigate potential weight-related concerns. Furthermore, it underscores the need for tailored counseling to address potential metabolic changes in women seeking contraceptive services.

Recommendations

- Monitoring and management of body composition changes through incorporating body composition assessments, such as Bio-Impedance Analysis (BIA), in routine healthcare services for women using hormonal contraceptives and establishing screening protocols to detect and manage changes in body fat percentage, ensuring timely interventions to mitigate potential health risks.
- Family planning counseling should incorporate education on potential weight-related effects of hormonal contraceptives, and support healthy lifestyle choices to mitigate adiposity.

- Given the safety profile, progestogen-only methods and non-hormonal options should be prioritized for overweight or obese women, particularly where vascular risk is a concern.
- Routine measurement of WC can enhance screening for metabolic risk and inform early interventions.
- Future research should extend follow-up beyond six months to clarify long-term weight trajectories among contraceptive users and incorporate direct measures of body composition.

Limitations

This study is not without limitations. First, the six-month follow-up period was relatively short and may not have been sufficient to capture long-term anthropometric changes associated with contraceptive use. Future studies with extended follow-up durations are needed to establish whether the observed trends persist or accumulate over time. Second, contraceptive use was partly based on self-reported information, which is subject to recall bias and potential misclassification, particularly in relation to consistency of use and method switching. Third, the study was conducted within a single urban ward in Nyeri County, which may limit the generalizability of the findings to rural populations or other regions with different demographic and socioeconomic characteristics. Finally, anthropometric assessments, while standardized and calibrated, remain subject to potential measurement error and may not fully capture changes in body composition, such as fat distribution or lean mass, that could be more precisely assessed using techniques such as bio-impedance analysis.

Despite these limitations, the study had several notable strengths. First, it employed a prospective design with baseline and endline assessments, which allowed for temporal observation of changes in nutritional status rather than relying on cross-sectional snapshots. Second, standardized WHO protocols were used for anthropometric measurements, and instruments were routinely calibrated, enhancing the reliability and comparability of the data. Third, the study controlled for important lifestyle factors—dietary diversity and physical activity—during regression analysis, which reduced confounding and provided a more nuanced understanding of the relationship between contraceptive use and anthropometric outcomes. Fourth, the relatively high follow-up completion rate (91%) minimized attrition bias and strengthened the internal validity of the findings. Finally, by situating the research in an urban Kenyan setting with high contraceptive prevalence, the study provides context-specific insights that contribute to the limited body of evidence on contraceptive use and nutritional status in sub-Saharan Africa.

Conflict of Interest

The authors declare no conflict of interest.

REFERENCES

Abbey B., B., & Rahman, M. (2009). Changes in weight, total fat, percent body fat, and central-to-peripheral fat ratio associated with injectable and oral contraceptive use. Am J Obstet Gynecol., 23(1), 1–7. https://doi.org/10.1016/j.ajog.2008.12.052

Agyapong, N. A. F., Annan, R. A., Apprey, C., Aduku, L. N. E., & Swart, E. C. (2020). The association between dietary consumption, anthropometric measures and body composition of rural and urban Ghanaian adults: a comparative cross-sectional study. BMC Nutrition, 6(1), 21. https://doi.org/10.1186/s40795-020-00339-6

Gallo, M. F., Legardy-Williams, J., Hylton-Kong, T., Rattray, C., Kourtis, A. P., Jamieson, D. J., & Steiner, M. J. (2016). Association of Progestin Contraceptive Implant and Weight Gain. Obstetrics and Gynecology, 127(3), 573–576. https://doi.org/10.1097/aog.0000000000001289

Ibrahim, H., Tengku Ismail, T. A., & Hashim, N. (2019). Comparison of body weight among hormonal and non-hormonal users in a Malaysian cohort. Journal of Taibah University Medical Sciences, 14(1), 25–30. https://doi.org/10.1016/j.jtumed.2018.11.012

KNBS. (2023). Demographic and Health Survey 2022. Demographic and Health Survey 2022, 1–23.

Kohn, J. E., Lopez, P. M., & Simons, H. R. (2015). Weight and body mass index among female contraceptive clients. Contraception, 91(6), 470–473. https://doi.org/10.1016/j.contraception.2015.02.006

Lopez, L. M., Bernholc, A., Chen, M., Grey, T. W., Otterness, C., Westhoff, C., Edelman, A., & Helmerhorst, F. M. (2016). Hormonal contraceptives for contraception in overweight or obese women. The Cochrane Database of Systematic Reviews, 2016(8), CD008452. https://doi.org/10.1002/14651858.CD008452.pub4

Lopez, L. M., Grimes, D. A., Chen, M., Otterness, C., Westhoff, C., Edelman, A., & Helmerhorst, F. M. (2013). Hormonal contraceptives for contraception in overweight or obese women. The Cochrane Database of Systematic Reviews, 4, CD008452. https://doi.org/10.1002/14651858.CD008452.pub3

Ministry of Health, M. (2019, November). Kenya Family Planning uptake improves. https://www.health.go.ke/kenya-family-planning-uptake-improves/

Mkuu, R. S., Epnere, K., & Chowdhury, M. A. B. (2018). Prevalence and Predictors of Overweight and Obesity Among Kenyan Women. Preventing Chronic Disease, 15, E44. https://doi.org/10.5888/pcd15.170401

Robinson, J. A., & Burke, A. E. (2013). Obesity and hormonal contraceptive efficacy. Women's Health (London, England), 9(5), 453–466. https://doi.org/10.2217/whe.13.41

Rosano, G. M. C., Rodriguez-Martinez, M. A., Spoletini, I., & Regidor, P. A. (2022). Obesity and contraceptive use: impact on cardiovascular risk. ESC Heart Failure, 9(6), 3761–3767. https://doi.org/10.1002/ehf2.14104

Sørensen, C. J., Pedersen, O. B., Petersen, M. S., Sørensen, E., Kotzé, S., Thørner, L. W., Hjalgrim, H., Rigas, A. S., Møller, B., Rostgaard, K., Riiskjær, M., Ullum, H., & Erikstrup, C. (2014). Combined oral contraception and obesity are strong predictors of low-grade inflammation in healthy individuals: results from the Danish Blood Donor Study (DBDS). PloS One, 9(2), e88196. https://doi.org/10.1371/journal.pone.0088196

Tesfaye, T. S., Zeleke, T. M., Alemu, W., Argaw, D., & Bedane, T. K. (2020). Dietary diversity and physical activity as risk factors of abdominal obesity among adults in Dilla town, Ethiopia. PloS One, 15(7), e0236671. https://doi.org/10.1371/journal.pone.0236671

United Nations, Department of Economic and Social Affairs, P. D. (2019). Family Planning and the 2030 Agenda for Sustainable Development: Data Booklet. Family Planning and the 2030 Agenda for Sustainable Development (Data Booklet). https://doi.org/10.18356/e154e49d-en

World Health Organisation (WHO). (2008). WHO | Waist Circumference and Waist–Hip Ratio. Report of a WHO Expert Consultation. Geneva, 8-11 December 2008. December, 8–11. http://www.who.int

World Health Organization (WHO). (2016). Selected practice recommendations for contraceptive use – 3rd ed. www.who.int/reproductivehealth/%0Apublications/family_planning/SPR-3/en/