East African Scholars Journal of Medical Sciences
Abbreviated Key Title: East African Scholars J Med Sci
ISSN: 2617-4421 (Print) & ISSN: 2617-7188 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-9 | Issue-11 | Nov-2026 | DOI: https://doi.org/10.36349/easms.2026.v09i11.006

Original Research Article

Changes in Body Mass Index and Blood Pressure during Hormonal Contraceptive Use among Women at the University Teaching Hospital in Lusaka, Zambia

Precious Kapambwe Jere [1]*, Bwalya Munjili[1], Patricia Kababa Mfwaenda[1], Apuleni Royd[1], Fennister Malumani [1], Besnart John Banda [1]

[1]School of Nursing Sciences, Levy Mwanawasa Medical University, Lusaka, Zambia

Article History
Received: 13.08.2026
Accepted: 05.10.2026
Published: 12.11.2026

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: ***Introduction***: Hormonal contraception is widely used for pregnancy prevention, but concerns remain about changes in body weight, body mass index (BMI), and blood pressure during use. Evidence from Zambia on these changes is limited. This study examined changes in BMI and blood pressure among women using hormonal contraception at the University Teaching Hospital (UTH) in Lusaka, Zambia, and assessed whether contraceptive type and age were associated with these outcomes. In Zambia, Simuyemba *et al*., (2025), including Munjili as a co-author, reported that hypertension self-care practices were associated with patients' knowledge and attitudes, underscoring the importance of patient-centred hypertension prevention and management in the local context [13]. ***Methods***: A quantitative retrospective cohort design was used. Records of 382 women aged 15–49 years who had received hormonal contraception at least twice and had relevant clinical measurements recorded were reviewed. Data on age, contraceptive type, duration of use, weight, height, systolic blood pressure, diastolic blood pressure and BMI were extracted into an electronic data-extraction form and analysed using STATA version 14. Descriptive statistics, tests of proportional differences, and multivariable regression models were used, with statistical significance set at $p<0.05$. ***Results***: The median age was 30 years and median height was 1.6 m. Median weight increased from 60.5 kg to 72.0 kg, while median BMI increased from 24.6 to 28.7. The proportion classified as overweight increased from 46.6% to 80.9% ($p<0.001$). Median systolic blood pressure increased from 118 to 122 mmHg, and median diastolic pressure increased from 70 to 80 mmHg. Recent systolic hypertension increased from 3.4% to 29.3%, while recent diastolic hypertension increased from 11.8% to 34.5%. However, contraceptive type was not consistently associated with hypertension after adjustment. Age was significantly associated with recent BMI (adjusted coefficient 0.3, 95% CI 0.2–0.4; $p=0.01$) and recent systolic and diastolic blood pressure (adjusted coefficient 0.5 for each; $p=0.01$). ***Conclusions***: The findings demonstrate substantial changes in BMI and blood pressure over the observed period but do not establish that hormonal contraception itself caused these changes. Continued clinical monitoring and further longitudinal research are warranted.

Keywords: Hormonal Contraception, Body Mass Index, Hypertension, Blood Pressure, Women of Reproductive Age, Zambia, University Teaching Hospital.

Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution **4.0 International License (CC BY-NC 4.0)** which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

1. INTRODUCTION

Contraception is an important component of reproductive health and family planning. Hormonal contraceptives include preparations containing synthetic oestrogen and/or progestin and are available in several forms, including oral preparations, injectables, implants, patches, vaginal rings and hormonal intrauterine methods. Global reproductive-health programmes emphasise access to effective family-planning information and services, while also recognising the importance of informed choice and attention to potential adverse effects [1].

Changes in body weight and BMI are among the outcomes that have been investigated in relation to contraceptive use. Previous evidence has examined

***Corresponding Author:** Precious Kapambwe Jere
School of Nursing Sciences, Levy Mwanawasa Medical University, Lusaka, Zambia

weight and BMI among contraceptive clients and has also explored how BMI may influence contraceptive choice [2, 3]. Prospective evidence among women using long-acting reversible contraception has reported changes in body composition over time, although differences between contraceptive groups were not always substantial [4]. Systematic reviews have likewise highlighted the complexity of interpreting weight-related outcomes because body composition may be influenced by age, baseline BMI, lifestyle and other factors [5, 6].

Blood pressure is another important consideration. Reviews have described small increases in systolic and diastolic blood pressure in some users of combined hormonal contraception and have identified age, BMI and previous hypertension as relevant factors in cardiovascular risk [7–11]. The relationship between BMI and hypertension is also well documented in population studies [12]. This local evidence is relevant because hypertension prevention and control extend beyond the biological effects of contraceptive exposure and include knowledge, attitudes and self-care behaviours [13].

The Zambian context makes this issue particularly relevant because hypertension represents an important non-communicable disease burden. In a 2025 Zambian study, Simuyemba *et al*., reported that knowledge and attitude were significantly associated with self-care practices among hypertensive patients in Mbala, highlighting the importance of hypertension-related monitoring and management in local clinical populations [13]. However, the evidence available locally on changes in BMI and blood pressure among women using hormonal contraception remains limited.

The research document underpinning this manuscript therefore examined records of women receiving hormonal contraception at UTH in Lusaka. The study specifically assessed changes in BMI and blood pressure between earlier and subsequent clinical measurements, compared outcomes by hormonal contraceptive type, and evaluated the influence of age.

The objectives were: (1) to determine changes in BMI and blood pressure before and after hormonal contraceptive use; (2) to compare outcomes according to single-hormone and combined-hormone contraception; and (3) to assess the influence of age on changes in BMI and blood pressure.

2. MATERIALS AND METHODS

2.1 Study Design, Setting and Participants

A quantitative retrospective cohort design was used. The study reviewed a closed cohort of women who had received hormonal contraception at least twice, allowing comparison of earlier and subsequent records of weight, height and blood pressure. The study was conducted at the University Teaching Hospital in Lusaka, specifically using records from the Women and Newborn Hospital family-planning service. The source document describes the clinic as serving women from diverse sections of Lusaka and maintaining records in hard-copy and electronic formats.

2.2 Study Population and Sample

The target population comprised women aged 15–49 years receiving hormonal contraception at UTH. The study population consisted of eligible records from the preceding 12-month record period. A total of 382 complete records were included. The research report describes a single-proportion sample-size approach using a 95% confidence level and p=0.50; the abstract separately refers to the Yamane formula. Because the present manuscript is based on the completed study dataset, the final analytical sample of 382 records is reported without reproducing the inconsistent formula description.

2.3 Sampling and Eligibility

Records were selected from women who had at least two visits for hormonal contraception and for whom the relevant variables were available. Consistency of hormonal contraceptive use was considered important. Only complete records containing the required information on contraceptive type, weight, height, blood pressure and age were used for analysis.

2.4 Data Collection

Data were extracted from family-planning records using a structured extraction tool. Variables included age, parity, occupation, duration of hormonal contraceptive use, contraceptive type, previous and recent weight, height, and blood pressure. BMI was derived from weight and height. The extracted information was entered into an Excel spreadsheet before cleaning, coding and export to STATA.

2.5 Measurement of BMI and Blood Pressure

BMI was calculated as weight in kilograms divided by height in metres squared. For the analysis presented in the research document, BMI of 18.5–24.9 kg/m² was classified as normal and BMI ≥25.0 kg/m² as overweight. Blood pressure categories were based on the cut-offs used in the source document, with systolic blood pressure ≥130 mmHg and diastolic blood pressure ≥80 mmHg treated as hypertension for the comparative analyses.

2.6 Data Analysis

Data were analysed using STATA version 14. Descriptive analysis used medians and interquartile ranges for the continuous variables and frequencies and percentages for categorical variables. Because the distributions were non-normal, the Shapiro–Wilk test was used to assess normality and medians were reported. Tests of proportional differences were used to assess differences between previous and recent classifications of systolic blood pressure, diastolic blood pressure and BMI. Multivariable regression models were used to

examine the influence of age, contraceptive type and duration of use. Estimates were presented with 95% confidence intervals and p-values, with $p<0.05$ considered statistically significant.

2.7 Data Quality and Ethical Considerations

The study used only records with complete information for the principal variables. Availability of the required variables was confirmed before extraction. Permission to conduct the study was sought from the University of Lusaka, ethical review was obtained through an independent review board or the University of Zambia Bio-Ethics Committee as described in the research report, and authority was sought from the National Health Research Authority Zambia. Clearance was also requested from UTH management. No names or contact details were extracted from the records.

3. RESULTS

3.1 Characteristics of the Study Records

A total of 382 records were analysed. The median age was 30 years (IQR 10), and median height was 1.6 m (IQR 0.2). Median weight increased from 60.5 kg (IQR 15) at the earlier measurement to 72.0 kg (IQR 21) at the subsequent measurement. Median systolic blood pressure increased from 118 mmHg (IQR 14) to 122 mmHg (IQR 12), while median diastolic blood pressure increased from 70 mmHg (IQR 16) to 80 mmHg (IQR 14). Median BMI increased from 24.6 kg/m² (IQR 6.0) to 28.7 kg/m² (IQR 6.8).

Table 1: Characteristics of women receiving hormonal contraception (n=382)

Variable	Previous/earlier	Recent/subsequent	IQR (as reported)
Age (years)	30	—	10
Height (m)	1.6	—	0.2
Weight (kg)	60.5	72.0	15 / 21
Systolic BP (mmHg)	118	122	14 / 12
Diastolic BP (mmHg)	70	80	16 / 14
BMI (kg/m²)	24.6	28.7	6.0 / 6.8

3.2 Type and Duration of Hormonal Contraception

Table 2: Type and duration of hormonal contraception use

Characteristic	Frequency	Percent
Single-hormone contraception	248	64.9
Combined-hormone contraception	134	35.1
<3 months	6	1.6
3–6 months	48	12.6
7–9 months	34	8.9
10–12 months	36	9.4
≥13 months	258	67.5

3.3 Changes in Blood Pressure

The proportion classified as systolic hypertension increased from 13/382 (3.4%) at the previous measurement to 112/382 (29.3%) at the recent measurement. The proportional difference was 25.9 percentage points (95% CI 12.9–38.9; p=0.045). For diastolic blood pressure, hypertension increased from 45/382 (11.8%) to 132/382 (34.5%), a difference of 22.7 percentage points (95% CI 10.2–35.1; p=0.004). The corresponding changes among those in the normal categories were also statistically significant.

Table 3: Changes in blood pressure categories between previous and recent measurements

Measure	Category	Previous n (%)	Recent n (%)	Difference	95% CI	p
Systolic	Normal	369 (96.6)	270 (70.7)	29.3	20.2–31.6	0.001
Systolic	Hypertension	13 (3.4)	112 (29.3)	25.9	12.9–38.9	0.045
Diastolic	Normal	337 (88.2)	250 (65.5)	22.7	15.9–29.5	0.001
Diastolic	Hypertension	45 (11.8)	132 (34.5)	22.7	10.2–35.1	0.004

3.4 Changes in BMI

Median BMI increased by 4.1 kg/m², from 24.6 to 28.7 kg/m². The proportion with BMI in the normal range (18.5–24.9 kg/m²) decreased from 204/382 (53.4%) to 73/382 (19.1%), while the proportion with BMI ≥25.0 kg/m² increased from 178/382 (46.6%) to 309/382 (80.9%). The reported proportional differences were statistically significant ($p<0.001$).

Table 4: Changes in BMI categories between previous and recent measurements

BMI category	Previous n (%)	Recent n (%)	Difference	95% CI	p	Cut-off
Normal 18.5–24.9	204 (53.4)	73 (19.1)	34.3	23.0–45.6	0.001	24.9
BMI ≥25.0	178 (46.6)	309 (80.9)	34.3	25.8–42.8	0.001	25.0

3.5 Association of Contraceptive Type and Duration with Blood Pressure

The study report found no statistically significant association between single- and combined-hormone contraception and the occurrence of hypertension in the principal comparative analysis. In adjusted models, combined contraception was not significantly associated with previous systolic blood pressure (coefficient −0.6, 95% CI −2.7 to 1.4; p=0.53), previous diastolic blood pressure (0.3, 95% CI −1.6 to 2.3; p=0.72), or recent systolic blood pressure (1.4, 95% CI −0.8 to 3.6; p=0.21). For recent diastolic pressure, combined contraception had an adjusted coefficient of 2.6 (95% CI 0.6–4.6; p=0.01).

Duration of use showed mixed associations across outcomes. For recent systolic pressure, compared with use for less than three months, adjusted coefficients were 8.9 (95% CI −0.1 to 17.8; p=0.05) for 3–6 months, 9.6 (0.6–18.9; p=0.04) for 7–9 months, 11.5 (2.4–20.5; p=0.01) for 10–12 months, and 10.9 (2.4–19.4; p=0.01) for ≥13 months. For recent diastolic pressure, none of the duration categories showed statistically significant adjusted associations.

3.6 Influence of Age on BMI and Blood Pressure

Age was not significantly associated with previous BMI (adjusted coefficient 0.1, 95% CI −0.0 to 0.1; p=0.12). In contrast, age was significantly associated with recent BMI: each one-year increase in age corresponded to an adjusted increase of 0.3 BMI units (95% CI 0.2–0.4; p=0.01). For recent systolic and diastolic blood pressure, the adjusted coefficient for age was 0.5 mmHg per year (p=0.01 for both outcomes). The findings therefore indicate that age was more clearly related to the later BMI and blood-pressure measurements than to the earlier BMI measurement.

4. DISCUSSION

4.1 Changes in Weight and BMI

The study identified a substantial change in body size over the observed period. Median weight increased by 11.5 kg and median BMI increased by 4.1 kg/m², with the proportion classified as overweight increasing from 46.6% to 80.9%. These findings indicate that considerable body-composition changes occurred between the earlier and subsequent clinical records. Similar concerns about weight and BMI among contraceptive users have been explored in previous research, although the literature does not consistently demonstrate that hormonal contraception alone explains such changes [2–6].

Silva dos Santos *et al*., reported that body-composition changes occurred among users of long-acting reversible contraception, but increases in body weight and body composition were not necessarily different across the contraceptive groups [4]. This is important when interpreting the present findings: the observed increase in BMI occurred during a period of hormonal contraceptive use, but the retrospective design and available variables do not permit the increase to be attributed solely to contraception. Age, lifestyle, parity, baseline BMI, metabolic factors and other unmeasured influences may also contribute.

4.2 Changes in Blood Pressure

Blood pressure increased between the earlier and subsequent measurements. Median systolic pressure increased from 118 to 122 mmHg, while median diastolic pressure increased from 70 to 80 mmHg. The categorical analysis also showed an increase in the proportion classified as hypertensive using the study cut-offs. These changes are clinically relevant because elevated blood pressure is an important cardiovascular risk factor, and local evidence has emphasised the importance of hypertension management and self-care in Zambia [13].

The findings are partly consistent with literature describing a relationship between hormonal contraception and blood-pressure changes. Perol *et al*., reported that combined hormonal contraceptives may be associated with small increases in systolic and diastolic blood pressure, while reviews by Gunaratne *et al*., and Wilkie *et al*., emphasised the roles of age, BMI and pre-existing hypertension in cardiovascular risk [7–9]. Shufelt and LeVee similarly stressed the importance of considering hypertension when selecting hormonal contraceptive methods [11].

Nevertheless, the present study did not demonstrate a consistent adjusted association between contraceptive type and hypertension. The discrepancy between observed within-record changes in blood pressure and the absence of a consistent contraceptive-type association suggests that the observed changes may reflect a combination of factors rather than contraceptive exposure alone. Differences in study design, duration of follow-up, population characteristics and control of confounding may also explain differences between this study and previous reviews [7–10].

4.3 Contraceptive type and Duration

Single-hormone contraception accounted for 64.9% of the records, while combined-hormone contraception accounted for 35.1%. Most records (67.5%) represented women who had used hormonal contraception for at least 13 months. The analysis showed that contraceptive type was not consistently

associated with blood-pressure outcomes. However, combined contraception was associated with recent diastolic pressure in the adjusted model, and several duration categories were associated with recent systolic pressure. These isolated associations should be interpreted cautiously because the study was based on clinical records and multiple predictors and outcomes were examined.

4.4 Influence of Age

Age emerged as a consistent factor in the later measurements. Each additional year of age was associated with a 0.3-unit increase in recent BMI and a 0.5-mmHg increase in both recent systolic and diastolic blood pressure after adjustment. The absence of a significant association between age and previous BMI, contrasted with the significant association with recent BMI, suggests that the timing of measurement matters. The findings are compatible with the broader literature identifying age and BMI as relevant cardiovascular risk factors in women using hormonal contraception [7-11].

The findings also support the need to interpret hormonal-contraception outcomes within the broader health profile of women rather than treating contraceptive exposure as an isolated determinant. The Zambian evidence from Simuyemba *et al*., [13], similarly demonstrates the importance of factors surrounding hypertension management and patient health behaviours, although that study examined hypertensive patients in Mbala rather than contraceptive users at UTH. The two studies therefore provide complementary rather than directly comparable evidence.

4.5 Interpretation and Implications

The main contribution of this study is its use of repeated clinical measurements from a Zambian hospital population to document changes in BMI and blood pressure among hormonal contraceptive users. The results show substantial changes over time, while the regression analyses caution against interpreting these changes as proof of a causal effect of hormonal contraception. The findings support continued clinical assessment of weight and blood pressure during contraceptive care and suggest that age should be considered when monitoring women over time.

5. CONCLUSION

Among 382 women receiving hormonal contraception at UTH, substantial changes occurred between earlier and subsequent clinical measurements. Median weight increased from 60.5 to 72.0 kg, median BMI from 24.6 to 28.7 kg/m², systolic blood pressure from 118 to 122 mmHg, and diastolic blood pressure from 70 to 80 mmHg. The proportion classified as overweight increased markedly, as did the proportion meeting the study's blood-pressure thresholds for hypertension. However, the study did not demonstrate a consistent adjusted association between contraceptive type and hypertension. Age was significantly associated with recent BMI and both recent systolic and diastolic blood pressure. These findings demonstrate important changes during the observed period but should not be interpreted as establishing a causal relationship between hormonal contraception and the outcomes.

6. Recommendations

1. Healthcare providers should continue to assess blood pressure and weight/BMI during contraceptive initiation and follow-up, particularly for women with pre-existing hypertension or other cardiovascular risk factors.
2. Contraceptive counselling should include discussion of monitoring weight and blood pressure while preserving informed choice of contraceptive method.
3. Further longitudinal studies should follow women from before initiation of hormonal contraception through multiple subsequent measurements and include non-hormonal comparison groups.
4. Future studies should control for age, baseline BMI, parity, diet, physical activity, smoking, family history, comorbidities and other potential confounders.
5. Larger multicentre studies in Zambia should be undertaken to determine whether the observed changes are reproducible across different health facilities and populations.

7. Limitations of the Study

The study was based on routinely collected clinical records, which limited the variables available for adjustment. The retrospective design also limits causal inference: changes observed after hormonal contraceptive use cannot, by themselves, demonstrate that contraception caused the changes. The study was conducted at a single tertiary facility and may not represent women using contraception in other settings. The source document also contains some inconsistencies in the description of sample-size calculation and terminology for contraceptive categories; the present manuscript reports the final analytical sample and the categories used in the results tables.

Acknowledgements

The authors acknowledge the University Teaching Hospital and the relevant family-planning service for facilitating access to the records used in the study. The authors also acknowledge the academic and institutional support provided during the conduct of the research.

Conflicts of Interest: The authors declare no conflict of interest regarding the publication of this manuscript.

REFERENCES

1. World Health Organization (2019) Contraception: Evidence Brief. Geneva: World Health Organization.

2. Kohn, J.E., Lopez, P.M. and Simons, H.R. (2015) Weight and body mass index among female contraceptive clients. Contraception, 91(6), 470–473. doi: 10.1016/j.contraception.2015.02.006.
3. Mosher, W.D., Lantos, H. and Burke, A.E. (2018) Obesity and contraceptive use among women 20–44 years of age in the United States: results from the 2011–15 National Survey of Family Growth. Contraception, 97(5), 392–398. doi: 10.1016/j.contraception.2017.11.007.
4. Silva dos Santos, P. de N. et al. (2017) Changes in body composition in women using long-acting reversible contraception. Contraception, 95(4), 382–389. doi: 10.1016/j.contraception.2016.12.006.
5. Rocca, M.L. et al. (2021) Safety and Benefits of Contraceptive Implants: A Systematic Review. Pharmaceuticals, 14(6), 548. doi:10.3390/ph14060548.
6. Lopez, L.M. et al. (2016) Hormonal contraceptives for contraception in overweight or obese women. Cochrane Database of Systematic Reviews, 2016(8). doi: 10.1002/14651858.CD008452.pub4.
7. Gunaratne, M.D.S.K., Thorsteinsdottir, B. and Garovic, V.D. (2021) Hypertension in women: contraception and pregnancy-related considerations. [Reference as cited in the source research document].
8. Perol, S., Hugon-Rodin, J. and Plu-Bureau, G. (2019) Hypertension artérielle et contraception. La Presse Médicale, 48(11), 1269–1283. doi: 10.1016/j.lpm.2019.07.033.
9. Wilkie, G. et al. (2022) Hypertension in Women: Impact of Contraception, Fertility, and Hormone Treatment. Current Cardiovascular Risk Reports, 16(12), 195–206. doi:10.1007/s12170-022-00705-y.
10. Afshari, M., Alizadeh-Navaei, R. and Moosazadeh, M. (2021) Oral contraceptives and hypertension in women: results of the enrolment phase of Tabari Cohort Study. BMC Women's Health, 21(1), 224. doi:10.1186/s12905-021-01376-4.
11. Shufelt, C. and LeVee, A. (2020) Hormonal Contraception in Women With Hypertension. JAMA, 324(14), 1451. doi:10.1001/jama.2020.11935.
12. Hossain, F.B., Adhikary, G. et al. (2019) Association between body mass index (BMI) and hypertension in South Asian population: evidence from nationally-representative surveys. Clinical Hypertension, 25(1), 28. doi:10.1186/s40885-019-0134-8.
13. Simuyemba, C.J., Phiri, F., Munjili, B., Nyahodah, I., Kachimba, J. and Siakapanga, S. (2025) Knowledge and Attitude of Hypertensive Patients towards Self-Care Practices in Mbala, Northern Province, Zambia. Open Access Library Journal, 12, e13616. doi:10.4236/oalib.1113616.

Cite This Article: Jere, P. K., Munjili, B., Mfwaenda, P. K., Royd, A., Malumani, F., & Banda, B. J. (2026). Changes in Body Mass Index and Blood Pressure during Hormonal Contraceptive Use among Women at the University Teaching Hospital in Lusaka, Zambia. *East African Scholars J Med Sci, 9*(11), 463-468. https://doi.org/10.36349/easms.2026.v09i11.006