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One-Year Declines in Bone Mineral Density Among Young Women in Uganda Using TDF-Based PrEP and DMPA

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BACKGROUND

- Injectable depot medroxyprogesterone acetate (DMPA) is the most common contraceptive choice among young women in Uganda and nearby countries
- In this region, HIV burden is also high and HIV PrEP is often offered for HIV prevention
- DMPA and TDF-based PrEP have been associated with reductions in bone mineral density (BMD) when used consistently over multiple years.
- For young women who have not yet reached peak bone mass and choose to use DMPA, it is unknown whether concurrent PrEP use exacerbates declines in BMD.

METHODS

- 2-year prospective observational study in Kampala, Uganda from May 2018-March 2022
- Women were ages 16-25 years and desiring prevention for pregnancy and HIV
- Study provided women with injectable DMPA, FTC/TDF as oral PrEP, and/or condoms, according to their choices
- Primary outcome: Change in bone mineral density at 12 months; BMD measured by annual dual x-ray absorptiometry (DXA) scans
- Exposure groups defined by: Tenofovir-diphosphate (TFV-DP) quantification in dried blood spots and delivery of DMPA injections. Each woman categorized at 12 months as: No PrEP or DMPA use (reference group), evidence of PrEP use only, evidence of DMPA use only, or evidence of using PrEP and DMPA
- Statistical methods: Linear regression models estimated the difference in % BMD change from baseline to month 12 for women using oral PrEP and DMPA versus women using either agent individually or neither agent

ACKNOWLEDGEMENTS

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INFECTIOUS DISEASES INSTITUTE

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Participants

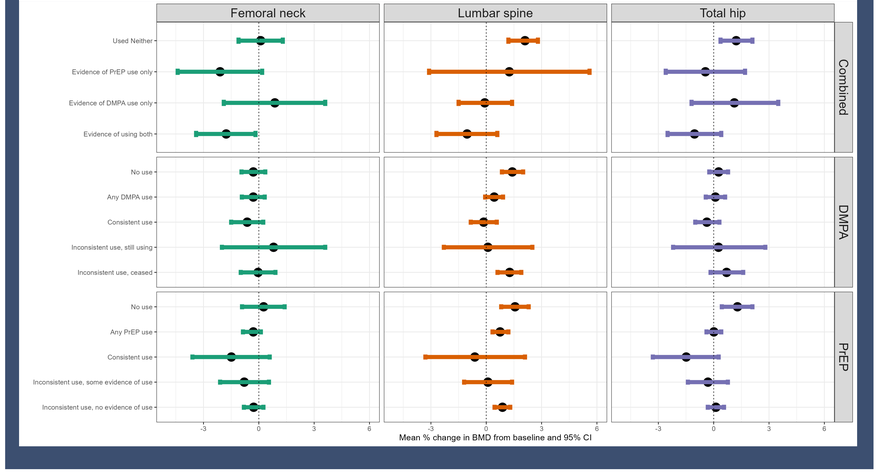
- 499 Ugandan women enrolled
- Median age is 20 and 50% are between 18-21 years
- 86.3% are unmarried with a steady partner; 12.0% are unmarried without a steady partner
- 52% earn their own income; 92% receive some financial or material support from a partner

Baseline choices in contraception and PrEP; Study retention

DMPA and PrEP N=249	DMPA ONLY N=20	PrEP ONLY N=183	NO PrEP, NO DMPA N=48
198 (79.5%) retained at M12	15 (75%) retained at M12	140 (76.5%) retained at M12	43 (89.6%) retained at M12
Person time without change in contraception/PrEP choice made at baseline 150.6 (70.7%) at M12	Person time without change in contraception/ PrEP choice made at baseline 12.0 (67.3%) at M12	Person time without change in contraception/PrEP choice made at baseline 118.7 (81.4%) at M12	Person time without change in contraception/PrEP choice made at baseline 43.0 (100%) at M12

We observed a trend for women with concurrent DMPA and PrEP use to have **1-3% lower bone mineral density** than unexposed women after 12 months of use.

Mean percentage change in bone mineral density from baseline to month 12, by PrEP and DMPA use and imaging region



Statistical comparisons of the percentage change in BMD from Baseline to Month 12, by PrEP and DMPA use, with adjustment for age and body mass index at baseline

	N	Adjusted difference in % BMD change (95% CI), p-value
Lumbar spine		
No PrEP or DMPA use	39	Reference
Evidence of PrEP use only	9	-0.45% (-2.86%, 1.96%), p=0.713
Evidence of DMPA use only	15	-2.29% (-4.43%, -0.15%), p=0.039
Evidence of using both	22	-3.35% (-5.13%, -1.56%), p=0.001
Total hip		
No PrEP or DMPA use	39	Reference
Evidence of PrEP use only	9	-1.35% (-3.56%, 0.86%), p=0.235
Evidence of DMPA use only	15	-0.30% (-2.26%, 1.16%), p=0.765
Evidence of using both	22	-2.24% (-3.87%, -0.60%), p=0.009
Femoral neck		
No PrEP or DMPA use	39	Reference
Evidence of PrEP use only	9	-1.69% (-4.42%, 1.04%), p=0.23
Evidence of DMPA use only	15	0.44% (-1.98%, 2.87%), p=0.722
Evidence of using both	22	-1.71% (-3.73%, 0.31%), p=0.102

For this analysis, exposure definitions are as follows: Used both means that participants had at least some evidence of PrEP use in dried blood spot (DBS) measurements and at least one DMPA injection; used DMPA only means that participants had at least one DMPA injection and were not prescribed PrEP ever during the study; used PrEP only means that no DMPA injections were given and there was at least some evidence of PrEP use in DBS; used neither means that participants were not prescribed PrEP and did not receive any DMPA injections.

CONCLUSIONS

- We observed a trend for women with concurrent DMPA and PrEP use to have 1-3% lower BMD than unexposed women after 12 months
- Given participant ages and exposure time, this difference may be clinically significant and further work is need to quantify the impact of longer concurrent exposure to TDF-based PrEP and DMPA.

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