

Endocrine disrupting chemicals in Pregnancy and correlation with household and cooking Products



ID-EP1238

Tarang Gupta, Rajeev Taliyan, Reeta Mahey, Neerja Bhatla, Garima Kachhawa
Department of Obstetrics and Gynecology, All India Institute of Medical Sciences, New Delhi, INDIA



Introduction

- Endocrine-disrupting chemicals (EDCs) are exogenous substances able to mimic or to interfere with the endocrine system, thus altering key biological processes such as organ development, reproduction, immunity, metabolism and behavior. These are widely distributed and even at very low doses, EDCs are likely to have endocrine-disrupting effects. **Rolfo, A., 2020**
- High concentrations of EDCs are found in several everyday products including plastic bottles and food containers and they could be easily absorbed by dietary intake.
- In recent years, considerable interest has been raised regarding the biological effects of EDCs, particularly Propyl paraben (PP) and Bisphenol-A (BPA) on human pregnancy and maternal outcome.
- Parabens (commonly used preservative agent): widely used in cosmetics, pharmaceuticals, personal care products and as food additives to inhibit microbial growth and extend product shelf life. **Karpuzoglu E 2013**

AIM

Aim is to correlate the first trimester serum Propyl paraben levels and Bisphenol-A use of household products & cooking utensil and correlate these parameter with pregnancy outcome

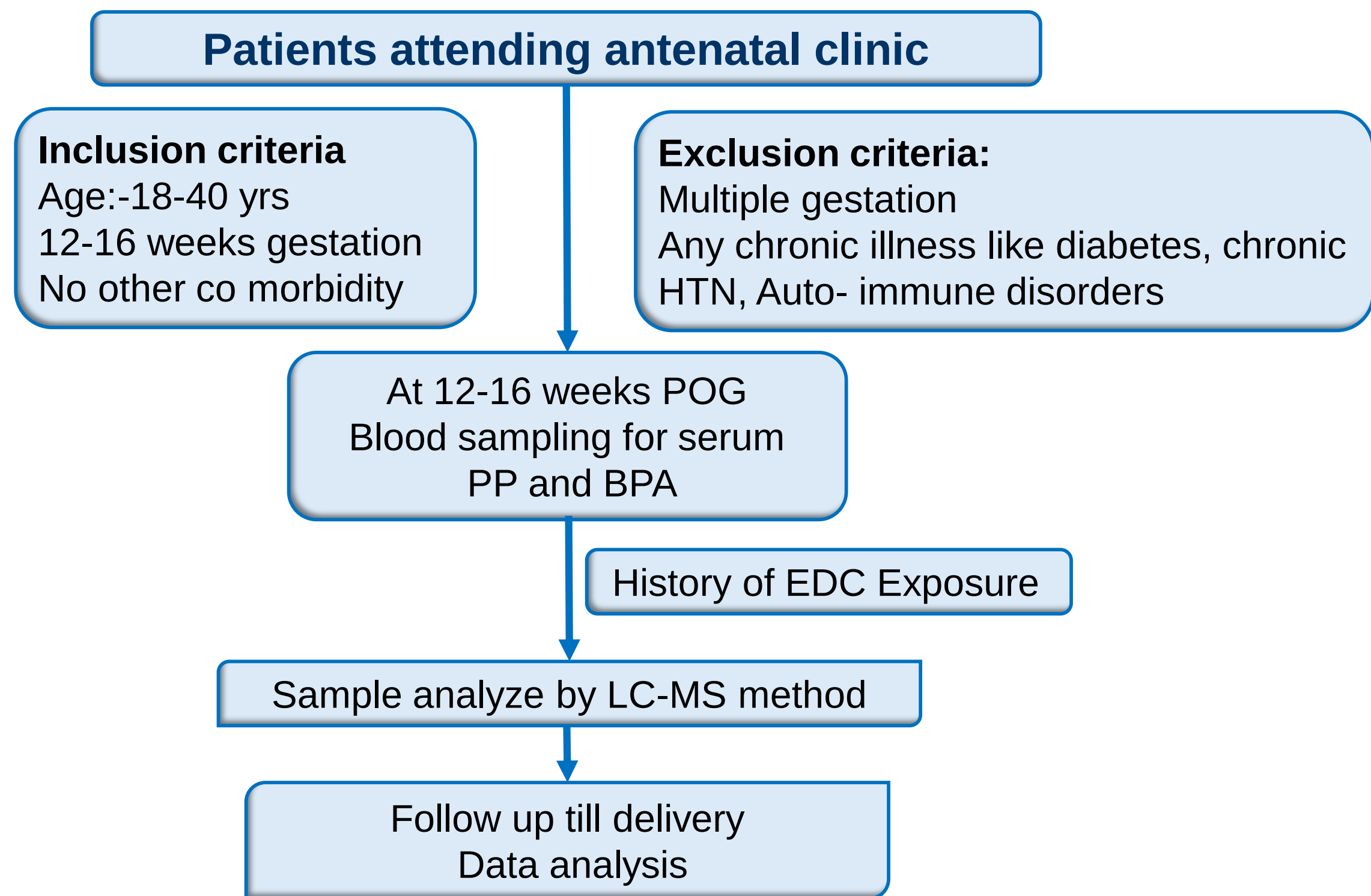
Methods

- Study design:** A Prospective study
- Study Settings:** Department of Obstetrics & Gynaecology, AIIMS, New Delhi
- Study group:** Women with singleton pregnancy (12-16 weeks)
- Sample Size:** 494
- Study period:** 2018-2022
- Outcome Measure:** Preeclampsia, Gestational hypertension and gestational diabetes

Statistical Analysis

- SPSS version 20.0
- Continuous variables were summarized using medians and interquartile ranges (IQR) due to non-normal distribution of the data, which was assessed using the nonparametric test.
- Group comparisons were performed using the Mann-Whitney U test (for two groups) or Kruskal-Wallis test (for more than two groups).
- P-values were calculated to determine the statistical significance of differences in median values between groups. A p-value less than 0.05 was considered statistically significant.

Methodology



Results

The mean age and BMI are 28.19±4.27 years & 25.03±4.4 Kg/m² in study population.

Demographic parameter	Mean ± SD
Age (in Years)	28.19±4.27
BMI (in Kg/m2)	25.03±4.4
Parity	
• Non-Parous	320 (64.6%)
• Parous	173 (35.4%)
Socioeconomic status	
• Upper class	8 (1.6%)
• Middle class	318 (64.2%)
• Lower class	162 (32.7%)

Table 1: Serum PP levels in household & cooking Products

Serum Propyl Praben (PP)	n	Users Median (min-Max)	n	Non user Median (min-Max)	P value
Aluminum utensil	35	4 (0-20)	172	3 (1-25)	0.001
Reuse of cooking oil	4	9 (7-11)	13	4 (2-20)	0.040
Plastic utensil in Microwave	7	10 (4-20)	11	4 (1-8)	0.004
Mosquito repellent	124	3.50 (1-20)	82	2 (0-25)	0.033
Cleansing product	14	6 (2-20)	3	4 (4-11)	0.097

Serum PP levels were more in users of aluminum utensil [4.0ng/ml(0-20) v/s 3.0ng/ml(1-25), p=0.001] compared with non users. Similarly serum PP levels were more in users of Reuse of cooking oil [9ng/ml (7-11) v/s 4ng/ml(2-20), p=0.040] & Plastic utensil in Microwave [10ng/ml (4-20) v/s 4ng/ml(1-8) p=0.004] and in users of Mosquito repellent [4.0ng/ml(1-20) v/s 2.0ng/ml(1-19), p=0.033] compared with nonusers showing in table number 1.

Serum PP levels (in ng/ml) in household & cooking Products

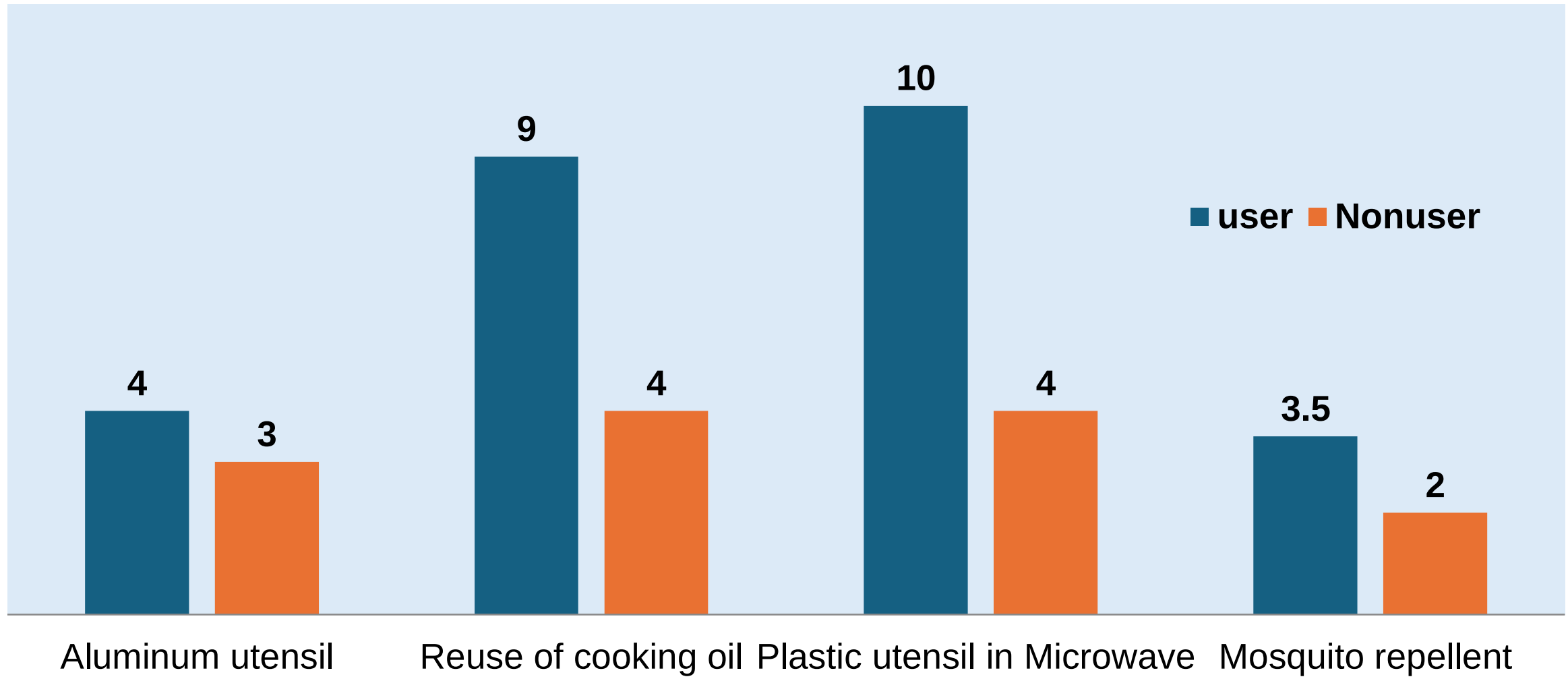


Table 2: Serum Bisphenol levels in household & cooking Products

Serum Bisphenol	n%	Users Median (min-Max)	n%	Non user Median (min-Max)	P value
Hair cosmetic (Dye)	15	1 (0-10)	23	0 (0-3)	0.063
Cleansing products	20	1 (0-10)	19	0 (0-10)	0.034
Vacuum packed food	18	1 (0-10)	21	0 (0-3)	0.032
Aluminum utensil	5	2 (1-3)	34	0 (0-10)	0.011

Same as in cleansing product and vacuum packed food product users. While BPA were significantly higher in users of hair cosmetic specially Dye, cleansing products, vacuum packed food and aluminum utensil [p=0.029, p=0.012, p=0.05 and p=0.019] showing in table number 2.

Bisphenol A levels in household & cooking Products

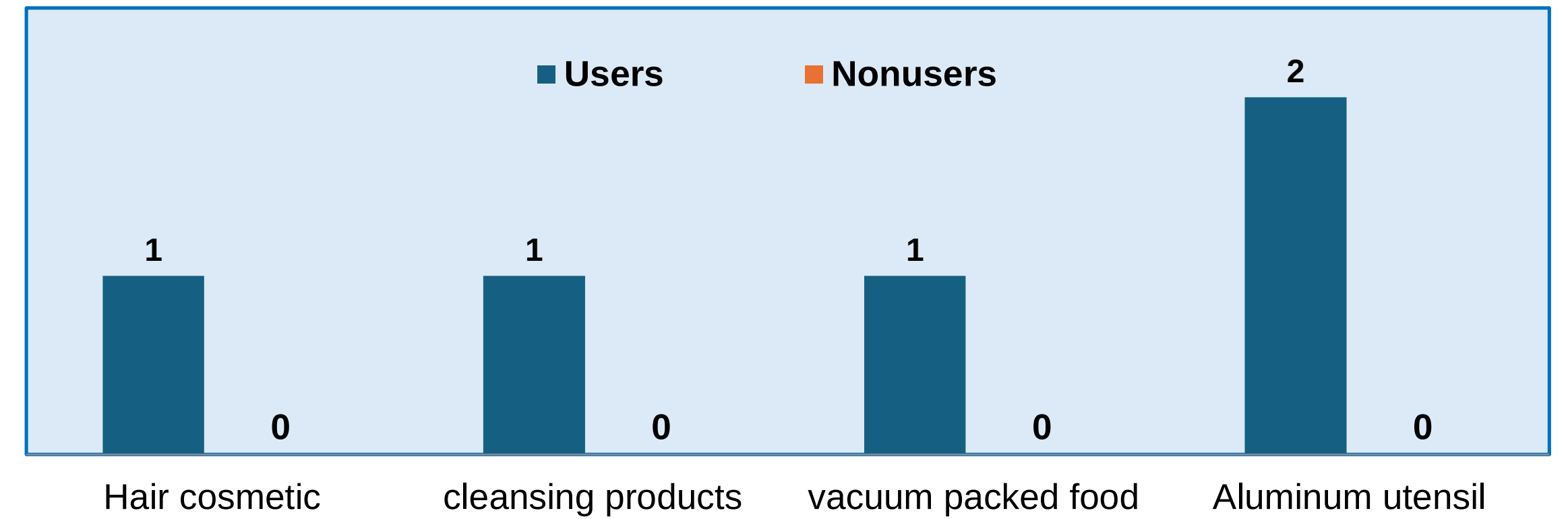


Table 3: EDC's levels in detected range with pregnancy outcome

EDC's	n	HDP (n=62)	n	GDM (n=156)	n	HP (n=276)	P value
Serum Bisphenol	5	1.42 (1.11-9.66)	15	0.48 (0.1-2.41)	18	0.21 (0.04-1.84)	0.081
serum propyl paraben	27	3.7 (1.03-20.44)	78	3.47 (0.7-19.88)	110	2.49 (0.34-24.51)	0.144

When we compared EDC level with maternal outcome like Hypertensive pregnancy (HDP) and Gestational diabetes with healthy pregnancy (HP), the serum bisphenol-A 1.42(1.11-9.66) v/s 0.48(0.1-2.41) v/s 0.21(0.04-1.84); p=0.081) and PP levels (3.7ng/ml (1.03-20.44) v/s 3.47ng/ml(0.7-19.88) v/s 2.49ng/ml(0.34-24.51); p=0.144) were higher in HDP women compared with HP showing in table number 3.

Correlation of maternal outcome with EDC's parameter in first trimester

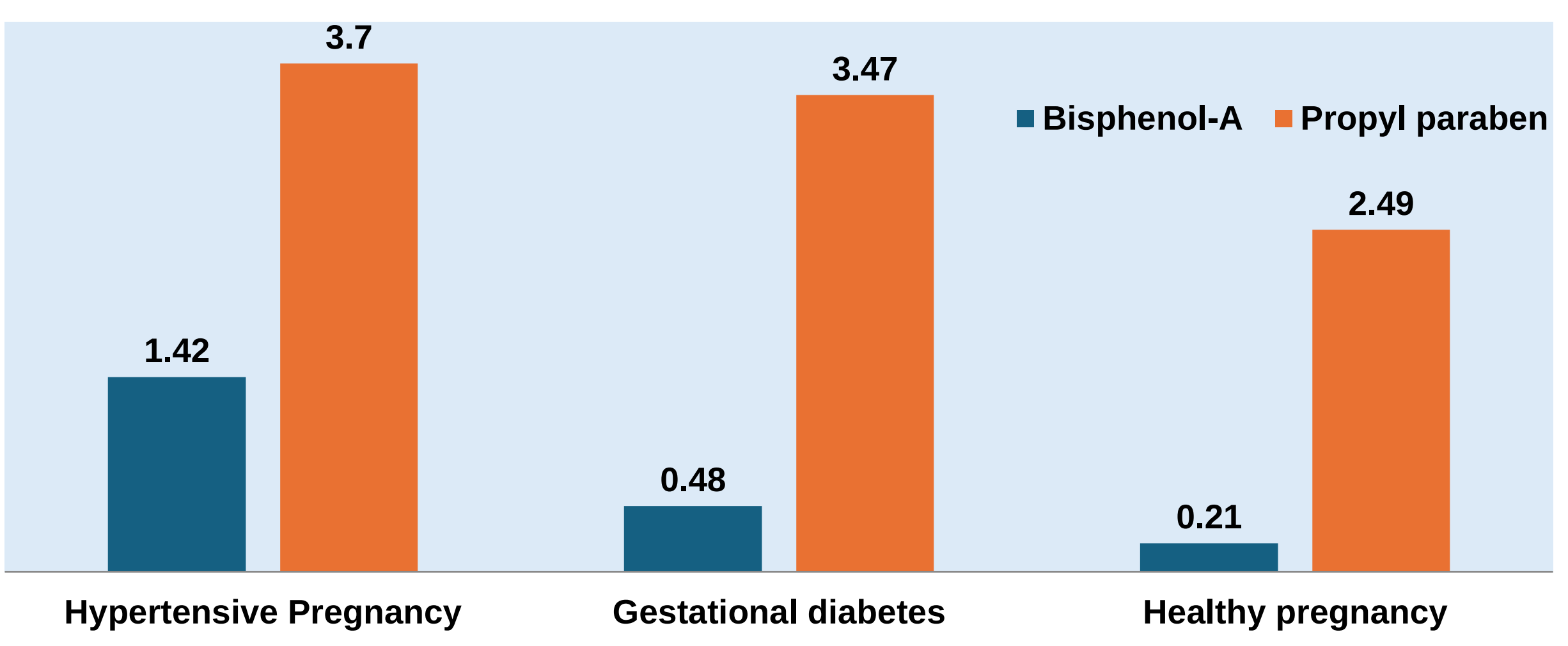
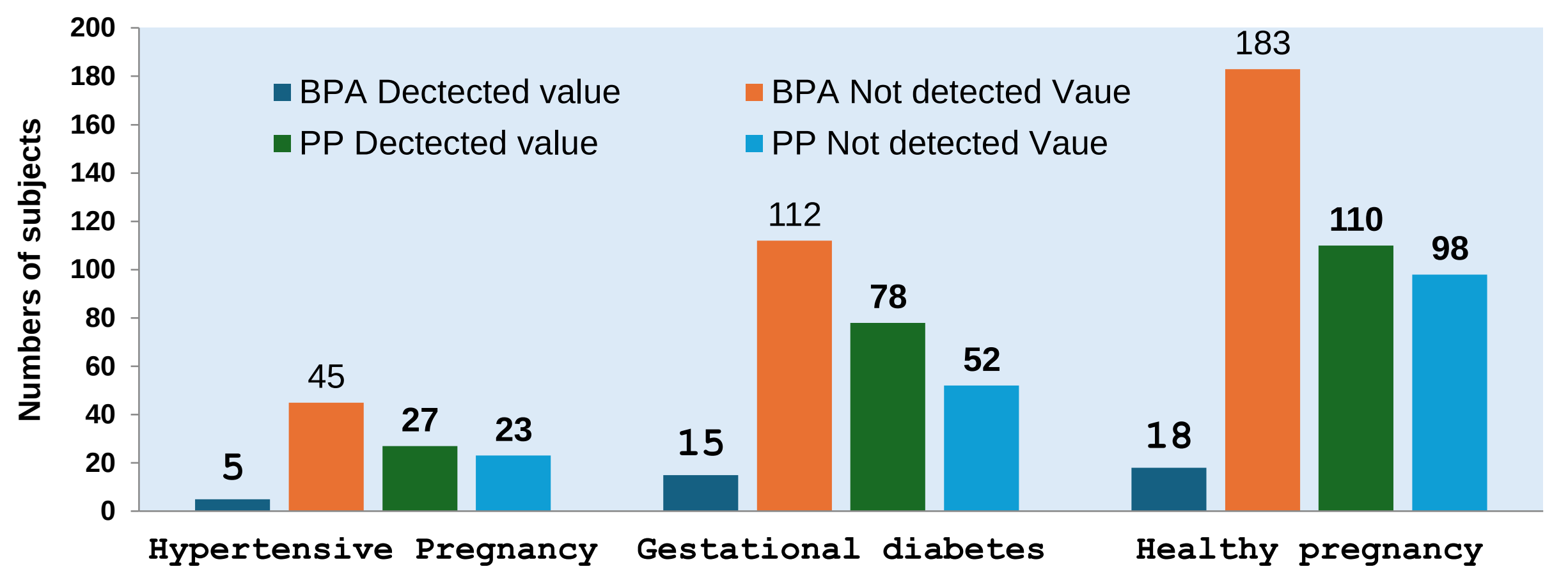


Table 4: EDC's levels with not detected range with pregnancy outcome

EDC's PARAMETERS	Not Detected	HDP	GDM	HP
Serum Bisphenol (numbers)	340	45	112	183
Serum propyl paraben (numbers)	173	23	52	98

EDC's levels with detected and not detected range with pregnancy outcome



Conclusion

Pregnancy is sensitive windows of susceptibility and our study has shown that certain household products users have more exposure to EDC's. So awareness of ecofriendly products may reduce to exposure for EDC during pregnancy. In the future, large sample size study may be plan to see the effect of EDC parameters with pregnancy outcome

References

- Rolfo, A., Nuzzo, A. M., De Amicis, R., Moretti, L., Bertoli, S., & Leone, A. (2020). Fetal–Maternal Exposure to Endocrine Disruptors: Correlation with Diet Intake and Pregnancy Outcomes. *Nutrients*, 12(6), 1744.
- Karpuzoglu E, Holladay SD, Gogal RM Jr. Parabens: potential impact of low-affinity estrogen receptor binding chemicals on human health. *J Toxicol Environ Health B Crit Rev.* 2013;16(5):321-35