

Association of Bisphenols Exposure and Serum Thyroid Hormones Level in Adults and Pregnant Women: A Systematic Review and Meta-Analysis

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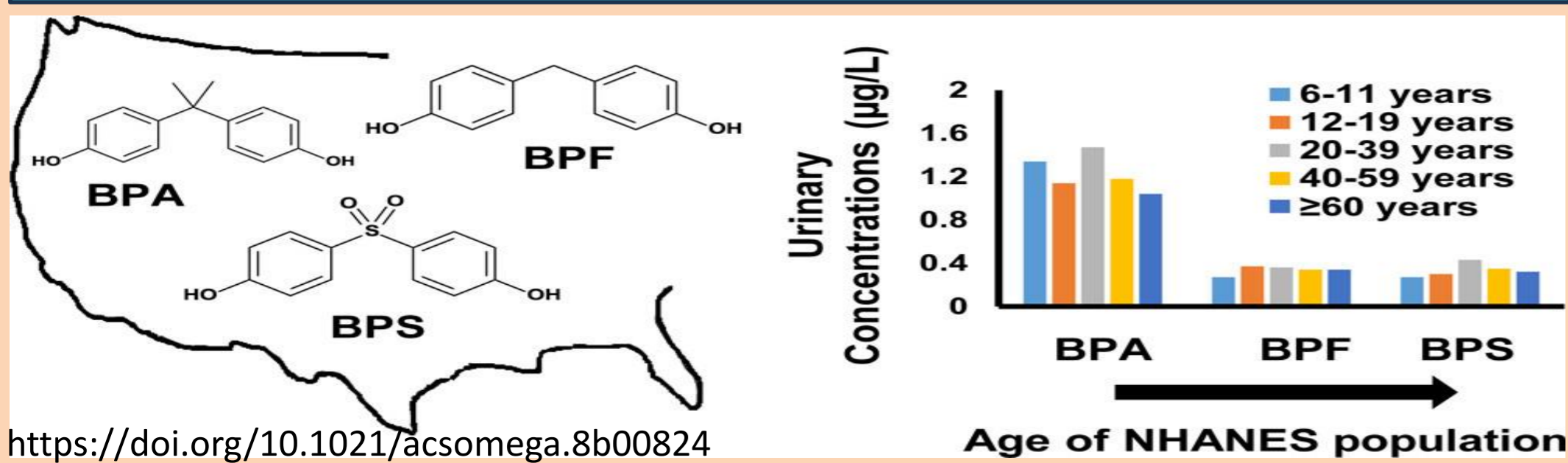
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INTRODUCTION & AIM

Background: Bisphenols are a class of endocrine-disrupting substances widely detected in global populations. As awareness of its toxicity increased, bisphenol A (BPA) was substituted with presumably less toxic alternatives, such as bisphenols S, F, and AF. Still, less attention has been given to these alternatives and mixed exposures.

Objective: Urinary bisphenols exposure and blood thyroid hormone levels in adults and pregnant women are examined in the meta-analysis.



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Figure I: Exposure to Bisphenol A, Bisphenol F, and Bisphenol S in U.S. Adults and Children

METHOD

An extensive search across Embase, Cochrane Library, PubMed, Web of Science, and CINAHL yielded 4160 articles using the PECO framework until July 4, 2023. Newcastle Ottawa Scale (NOS) and Agency for Healthcare Research and Quality (AHRQ) methods were used for quality assessment, with aggregate hazards evaluated using a random effect model. The I^2 test was used to evaluate heterogeneity. R version 4.3.2 was used for meta-analysis.

Inclusion Criteria

(a) Cohort, case-control, and cross-sectional epidemiological research. (b) The exposure factor was urinary Bisphenols (A, S, F, B, and TBBPA). (c) The study found a link between urinary Bisphenol exposure and serum thyroid hormones (TSH, T3, T4, FT3, FT4, TT3, TT4). (d) The study provided Beta, SE, and 95% CI data. (e) The literature quality score is higher than 7.

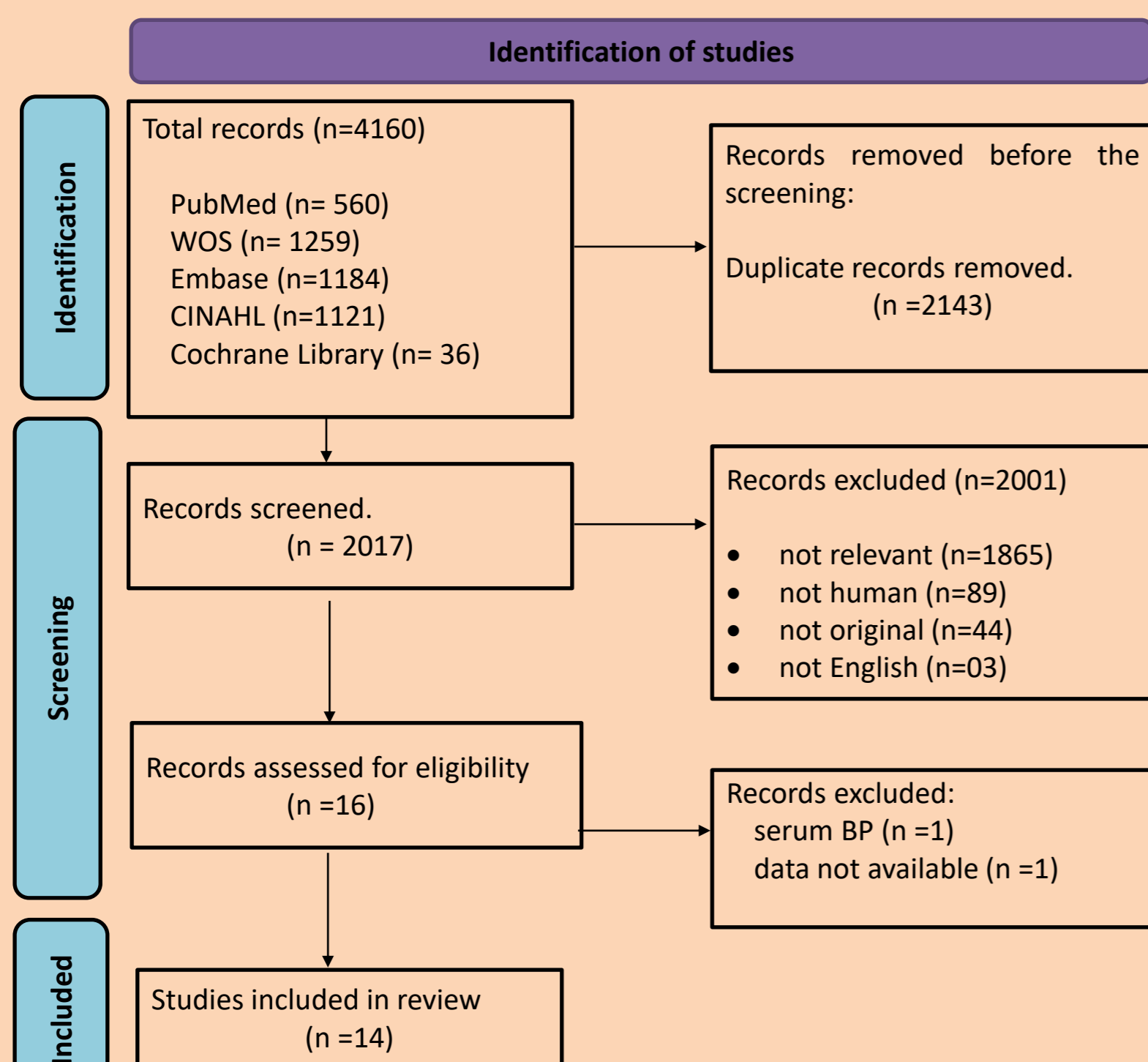


Figure II: Literature screening flowchart (PRISMA 2020)

RESULTS & DISCUSSION

Fixed model estimates revealed a negative association between BPA and thyroid-stimulating hormone (TSH) in adults ($\beta = -0.02$; 95% CI: $-0.04, -0.01$), Females' subgroup analysis indicated a positive association between BPA and free thyroxine (FT4) ($\beta = 0.010$; 95% CI: $0.001, 0.011$), $P = 0.001$, where no association was observed between bisphenols A, S (BPs) and FT4 in early and BPA and FT4 in mid-pregnancy ($\beta = 0.020$; 95% CI: $-0.061, 0.101$), ($\beta = 0.011$; 95% CI: $-0.011, 0.030$), $P = 0.553$, $P = 0.318$, respectively.

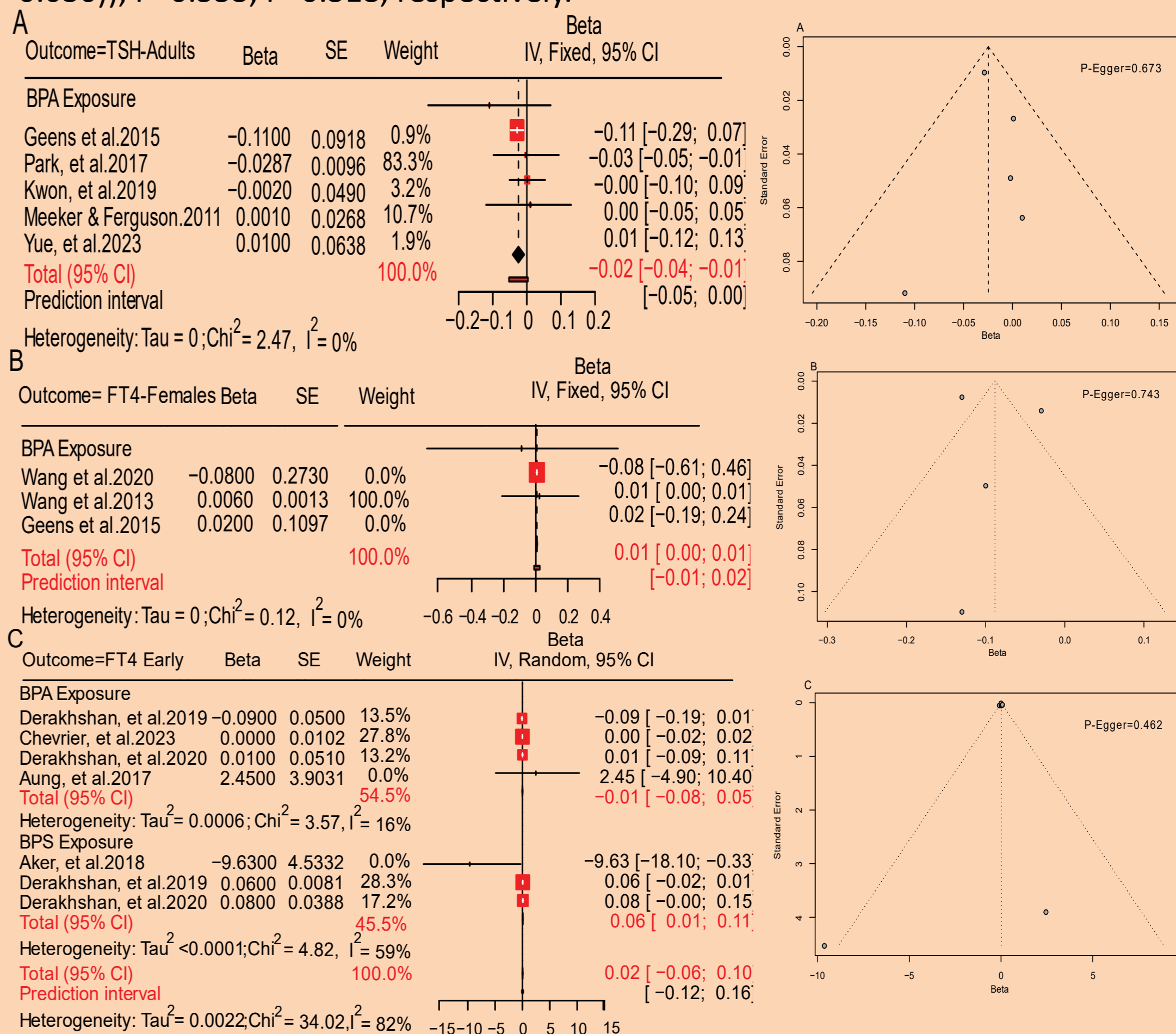


Figure III: Association of bisphenols exposure to thyroid hormones in Adults

CONCLUSION

Bisphenols have the potential to significantly influence thyroid hormone concentrations in both genders, adults, and pregnant women. Gender-based disparities were noted in the impact of bisphenols on thyroid hormone levels, which concluded that adult females without pregnancy are more affected by bisphenol exposures than adult males.

FUTURE WORK / REFERENCES

A large cohort and cross-sectional investigation focusing on the effect of bisphenol exposure on thyroid hormone levels could provide more reliable information.

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