Review Article

Impact of prenatal triclosan exposure on gestational age and anthropometric measures at birth: A systematic review and meta-analysis

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Background: Exposure to endocrine disrupting chemicals such as triclosan (TCS) leads to disrupting the endocrine system and consequently effect on the birth outcomes. The findings of studies in this field are controversial. **Materials and Methods:** This systematic review and meta analysis was conducted based on the identified published papers in Scopus, Web of Science, and PubMed up to November 2019. All steps, including searching, screening, data extracting, and quality assessment, were done by two independent researchers. **Results:** Finally 15 published papers selected. The number of participants in whom the association of TCS exposure was assessed with birth weight, birth length, birth head circumference, and gestational age were 9112, 4311, 2854, and 3181 mother infant pairs, respectively. The pooled analysis showed that TCS exposure during pregnancy leads to increasing the birth weight for boys with β= 3.97 and 95% confidence interval (CI) (−3.98, 11.92), and girls with β= 5.37, 95% CI (−6.00, 16.75), but the association was not statistically significant. In addition, according to fixed effects models, the TCS exposure was not significantly associated with birth length (−0.008, 95% CI [−0.049, 0.034]), birth head circumference (−0.01, 95% CI [−0.08, 0.06]), and gestational age (−0.005, 95% CI [−0.017, 0.006]). Likewise, analysis for data segregated by gender of infants revealed similar results. **Conclusion:** The obtained results depicted that the TCS exposure during pregnancy period was associated with higher birth weight for boys and girls. No significant association was observed for TCS exposure with variation of birth length, head circumference, and gestational age duration. In fact, the results showed the evidence of null associations between maternal TCS exposure and birth outcomes.

Key words: Birth length, birth weight, gestational age, head circumstance, triclosan

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INTRODUCTION

Birth outcomes, such as birth weight, birth length, birth head circumference, abdominal circumference, and gestational age, have been associated with an increase in newborn's morbidity and mortality and the risk of disability, cerebral palsy, visual problems, learning disabilities, and respiratory problems.[1-3]

The causes of adverse birth outcomes such as low birth weight and small for gestational age are multifactorial and are not clear yet. Exposures to chemicals with estrogenic and/or antiandrogenic effects can disrupt the endocrine system functions, i.e., endocrine-disrupting chemicals (EDCs) such as phenolic compounds might affect birth outcomes through different hormone-related mechanisms.[4,5]

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Phenolic compounds include various classes of chemicals including parabens, triclosan (TCS), and bisphenols. They are the common components used in consumer products that have tendency to cause hormonal disturbances during *in utero* and *ex utero* development.[4,6] Exposure to these compounds usually occurs using personal care products in adults. The presence of these compounds in blood, milk, and amniotic fluid can be the exposure route for embryo and infants.[6,7]

In several consumer products including toothpaste, mouthwash, disinfectants, and soaps, the TCS is used as a bactericide and fungicide agent. Due to the widespread usage of consumer products, the people are broadly exposed to TCS through both ingestion and dermal route. Conducted studies on the US and China national population reported that in 74% and 98.2% of urine samples, TCS was detected.[8,9] In addition, TCS was detected in other biological fluids such blood and breast milk. The endocrine-disrupting properties of TCS include the influence of the antiandrogenic activity and thyroid hormone function.[4,7]

From 2008 up to now, numerous studies have been conducted to investigate the likelihood relationship of prenatal TCS exposure and birth outcomes. Different results were reported for the associations of TCS concentrations with birth outcomes such as birth weight and length, as well as gestational age.[10-12]

Taken together, exposure to TCS during intrauterine life may influence fetal growth and consequently birth outcomes; however, controversial findings led to uncertainty in this regard.

In brief, the associations between maternal TCS exposure and newborn's birth size remain unclear. The previous studies demonstrated the positive or negative direction of association and sex-specific differences which have been not well proved. Therefore, in this study, we systematically reviewed the current literatures and conducted a meta-analysis to find the association between maternal TCS exposure and birth weight, birth length, birth head circumference, and gestational age.

METHODS

This review was done based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines for systematic reviews.[13]

Eligibility criteria

Study requirements

Studies with a cohort and cross-sectional design were included. No restrictions on publication date and language were applied in the search date until November 2019.

Participants, exposure, and outcome measures

To evaluate the association between TCS exposure of pregnant women and birth outcomes, the mother–infant pairs were considered. The pregnant women participating in studies were healthy women in each stage of pregnancy, without any history of specific illnesses or long-term use of medications. The maternal urinary TCS during pregnancy as a TCS exposure biomarker and also the infant characteristics including birth weight, birth length, birth head circumstance, and gestational age were targeted birth outcomes. Studies with a cohort and cross-sectional design were included only if they met the inclusion criteria and studies with any intervention were excluded. The presented data in full text of selected manuscripts and their appendices were used for meta-analysis.

Information sources and search strategy

The comprehensive search in electronic bibliographic databases including Scopus, Web of Science, and PubMed was carried out. The following terms using Medical Subject Headings (MeSH) comprise "birth outcome" OR "fetal growth" OR "birth weight" OR "birth size" OR "Fetal Macrosomia" OR "gestational age" OR "preterm birth" AND "Triclosan" and their relating terms and various words encompassing them were used as keywords for searching in database. For achieving a thorough list of all researches covering these combinations of keywords, truncations such as AND and OR were used based on Boolean logic.[14] More details on search strategy are presented in Supplementary Table 1.

Data management, screening process, data extraction, and quality assessment

For data management, the EndNote software X8 (Thomson Scientific, USA) was used. After duplicates removal from EndNote library, the screening was done as follows:

- Titles and abstracts checking: Two independent researchers screened the studies based on their title and abstract. The irrelevant studies were removed, and when there is a doubt about an article, researchers decided after discussing, otherwise it was postponed to the next stage.
- Full-text checking: The full-text articles identified in the previous stage were checked based on inclusion criteria, and the data collection form was completed for each paper in this stage and contains first author's last name, year of publication, study location, sample size, and outcomes. To find additional related studies, the reference lists of included papers were checked.

The published checklist by the National Heart, Lung and Blood Institute for Quality Assessment of Observational Cohort and Cross-sectional Studies was used by two reviewers to assess the risk of bias of the included papers

based on the scoring system.[15] The checklist contains 14 questions about research question or objectives, population specification and definition, participation rate, recruitment and uniformity, sample size, priority of exposure and outcome, timeframe, exposure categorizing, independent variables, definition and assessment, outcome measures and blinding, attrition bias, and control of confounding. The studies were rated as either good, fair, or poor based on the mentioned criteria.[16]

Statistical analysis

The regression (β) coefficient values of selected studies were applied for pooled analysis. The potential heterogeneity across studies was evaluated using the Cochran's *Q*-test and expressed using the I^2 index. The pooled results were calculated by the fixed-effects model (for $I^2 < 50\%$) or the random-effects model (for $I^2 > 50\%$). Publication bias was evaluated by the Egger's and Begg's tests.[17] All statistical analyses were conducted using software Stata 12.0 (StataCorp, College Station, Texas, USA).

RESULTS

From 149 identified studies, 15 studies were included in the meta-analysis after title, abstract, and full-text checking [Figure 1]. All these studies had evaluated the effect of prenatal TCS exposure on at least one of the birth outcomes including birth weight, birth length, birth head circumference, and gestational age and were conducted in different countries without any geographical restriction. From 15 selected studies, 12 studies were cohort and 3 studies were cross-sectional studies. The number of studies that reported the association of TCS exposure with birth weight, birth length, birth head, and gestational age was 13,[4,7,10-12,18-25] 9,[4,6,7,11,12,18,22,23,26] 8,[4,6,7,12,18,19,22,26] and 6,[4,6,11,12,22,25] respectively. All studies had evaluated the prenatal exposure to TCS and growth in both male and female neonates, except 2 studies that investigated it in male infants.[18,21]

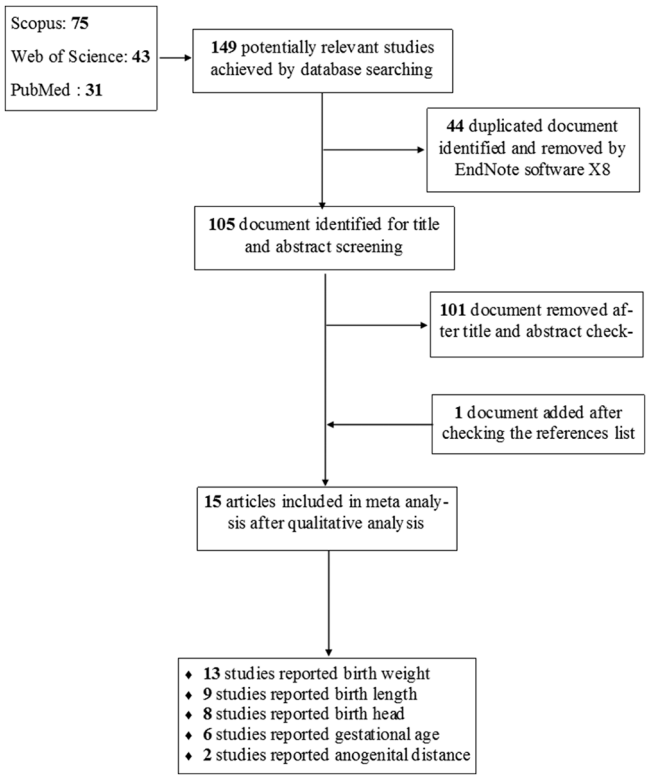

Figure 1: The study selection process in brief

More details related to the included studies are available in Table 1. The results (after the agreement between both independent researchers) of the quality assessment for included studies are summarized in Table 2 and showed that all included studies had good quality and low risk of bias.

Effect of prenatal triclosan exposure on birth weight

Of the 13 studies that have reported the relationship of TCS exposure and birth outcomes,[4,7,10-12,18-25] two studies have included only male infants[18,21] and the remaining studies have investigated both male and female infants. Moreover, 4 studies reported the birth weight *Z*-score.[22-25] The total population from 13 included studies was 9112 mother–infant pairs. The pooled analysis of TCS exposure was associated with the increased birth weight for boys and girls, 3.97, 95% confidence interval (CI) (−3.98, 11.92), and 5.37, 95% CI (−6.00, 16.75), respectively, and decreased birth weight for both − 0.032, 95% CI (−11.59, 11.53), using the random-effects models. However, none of these effects were significant. A significant heterogeneity was detected for the meta-analysis of effect TCS exposure on birth weight for total ($I^2 = 54.0\%$, $P = 0.043$) [Figure 2]. In addition, the pooled effect of TCS exposure on birth weight *Z*-score was not also significant for girls, boys,

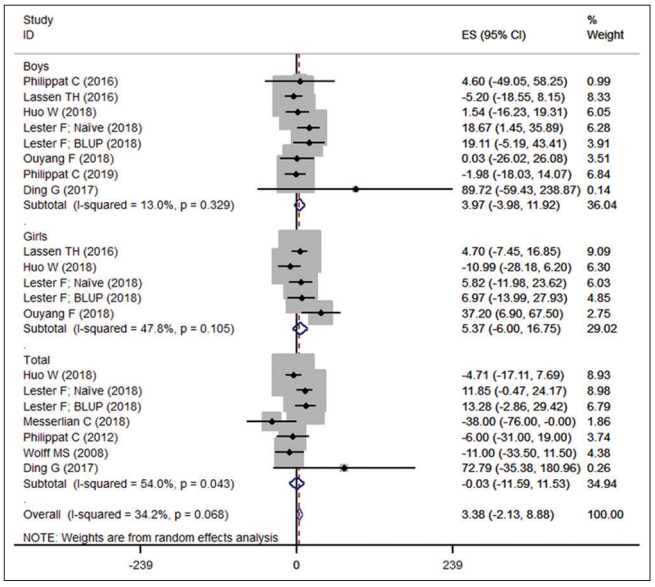

Figure 2: Forest plot of beta-coefficients for the effect of triclosan exposure on birth weight by gender

Table 1: Characteristics of the studies included

Author, year	Country	Participants	Maternal urine sampling time	Outcomes	Study type
Wolff *et al.*, 2008[12]	USA	Mothers and infants	Third trimester	Birth weight - birth length - head circumference - gestational age	Cohort study
Philippat *et al.*, 2014[18]	France	Mother-son	Second or third trimester	Birth weight - birth length - head circumference	Cohort study
Lassen *et al.*, 2016[7]	Denmark	Mothers and infants	Third trimester	Birth weight - birth length - head circumference - abdominal circumference - anogenital distance	Cohort study
Ding *et al.*, 2017[4]	China	Mothers and infants	Delivery time	Birth weight - birth length - head circumference - gestational age - ponderal index	Cross-sectional study
Etzel *et al.*, 2017[22]	USA	Mothers and infants	Second and third trimesters	Birth weight - birth length - head circumference - gestational age	Cohort study
Geer *et al.*, 2017[6]	USA	Mothers and infants	third trimester	Birth weight - birth length - head circumference - gestational age	Cohort study
Ferguson *et al.*, 2018[23]	USA	Mothers and infants	Second and/or third trimester	Birth weight - birth length	Cohort study
Huo *et al.*, 2018[11]	China	Mothers and infants	Delivery time	Birth weight - birth length - gestational age	Cross-sectional study
Lester *et al.*, 2018[10]	Canada	Mothers and infants	First or second trimester	Birth weight - low birth weight - small for gestational age - large for gestational age	Cohort study
Messerlian *et al.*, 2018[19]	USA	Mothers and infants	Cannot determine	Birth weight - head circumference	Cohort study
Ouyang *et al.*, 2018[20]	China	Mothers and infants	Delivery time	Birth weight - gestational diabetes mellitus	Cross-sectional study
Wu *et al.*, 2018[24]	China	Mothers and infants	First, second, and third trimesters	Birth weight - birth length	Cohort study
Aker *et al.*, 2019[25]	USA	Mothers and infants	Second and third trimesters	Birth weight - gestational age	Cohort study
Philippat *et al.*, 2019[21]	France	Mother-son	Second or third trimester	Placental weight - birth weight - placental-to-birth weight ratio	Cohort study
Philippat *et al.*, 2012[26]		Mother-son	First or second or third trimester	Birth weight - birth length - head circumference	Cohort study

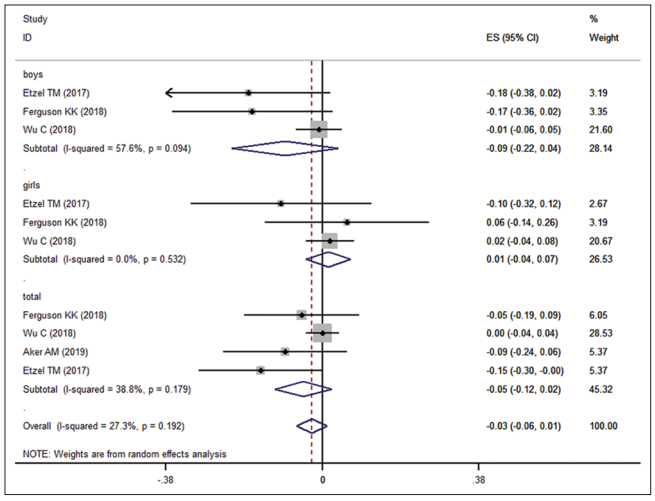

Figure 3: Forest plot of beta-coefficients for the effect of triclosan exposure on birth weight Z-score by gender

and total. The heterogeneity was not significant for them ($P > 0.05$) [Figure 3]. The P values for Begg's test and Egger's test for birth weight were 0.538 and 0.419, respectively, that revealed no obvious publication bias among these studies. However, Begg's test and Egger's test for birth weight Z-score suggested publication bias, $P < 0.001$, respectively. Trim-and-fill analysis was conducted, but no study was filled. This showed that the publication bias had a nonsignificant effect on the results.

Effect of prenatal triclosan exposure on birth length

Birth length association with prenatal TCS exposure was investigated in 9 studies.[4,6,7,11,12,18,22,23,26] Except Philippat *et al.*'s study,[18] all other studies survived both genders of infants and contain 4311 mother–infant pairs.

The pooled analysis of TCS exposure was not significantly associated with the birth length for boys (0.016, 95% CI [−0.029, 0.062]), girls (−0.02, 95% CI [−0.062, 0.022]), and total (−0.008, 95% CI [−0.049, 0.034]) based on fixed-effects models. Furthermore, there was no significant heterogeneity for them [Figure 4]. Begg's test and Egger's test revealed no obvious publication bias among these studies; the P values for these tests were >0.05 ($P = 0.558$ and 0.124, respectively).

Effect of prenatal triclosan exposure on birth head circumference

The extracted data from 8 studies[4,6,7,12,18,19,22,26] related to effect TCS exposure on birth head and covering 2854

Table 2: Quality assessment of included studies

Criteria	Wolff *et al.*, 2008[12]	Philippat *et al.*, 2014[18]	Lassen *et al.*, 2016[7]	Ding *et al.*, 2017[4]	Etzel *et al.*, 2017[22]	Geer *et al.*, 2017[6]	Ferguson *et al.*, 2018[23]
1. Was the research question or objective in this paper clearly stated?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. Was the study population clearly specified and defined?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3. Was the participation rate of eligible persons at least 50%?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5. Was a sample size justification, power description, or variance and effect estimates provided?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6. For the analyses in this paper, were the exposure (s) of interest measured prior to the outcome (s) being measured?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?	CD	CD	CD	CD	CD	CD	CD
8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure or exposure measured as continuous variable)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10. Was the exposure (s) assessed more than once over time?	No	No	No	No	yes	No	No
11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12. Were the outcome assessors blinded to the exposure status of participants?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13. Was loss to follow-up after baseline 20% or less?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure (s) and outcome (s)?	Yes	No	Yes	Yes	Yes	Yes	Yes

Criteria	Huo *et al.*, 2018[11]	Lester *et al.*, 2018[10]	Messerlian *et al.*, 2018[19]	Ouyang *et al.*, 2018[20]	Wu *et al.*, 2018[24]	Aker *et al.*, 2019[25]	Philippat *et al.*, 2019[21]	Philippat *et al.*, 2012[26]
1. Was the research question or objective in this paper clearly stated?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2. Was the study population clearly specified and defined?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3. Was the participation rate of eligible persons at least 50%?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5. Was a sample size justification, power description, or variance and effect estimates provided?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6. For the analyses in this paper, were the exposure (s) of interest measured prior to the outcome (s) being measured?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?	CD	CD	CD	CD	CD	CD	CD	CD

Contd...

Table 2: Contd...

Criteria	Huo *et al.*, 2018[11]	Lester *et al.*, 2018[10]	Messerlian *et al.*, 2018[19]	Ouyang *et al.*, 2018[20]	Wu *et al.*, 2018[24]	Aker *et al.*, 2019[25]	Philippat *et al.*, 2019[21]	Philippat *et al.*, 2012[26]
8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure or exposure measured as continuous variable)?	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10. Was the exposure (s) assessed more than once over time?	No	No	No	No	yes	No	No	No
11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12. Were the outcome assessors blinded to the exposure status of participants?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13. Was loss to follow-up after baseline 20% or less?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure (s) and outcome (s)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

CD: Cannot determine

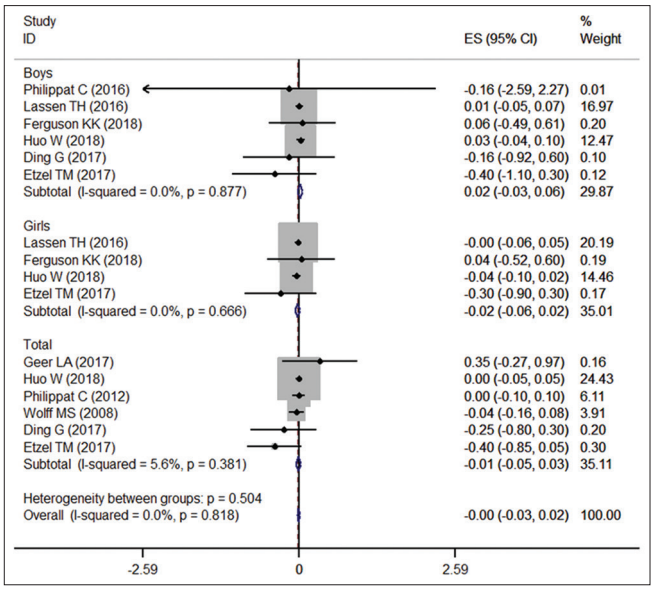

Figure 4: Forest plot of beta-coefficients for the effect of triclosan exposure on birth length by gender

mother–infant pairs were used. The pooled analysis of TCS exposure was associated with the decreased birth head for boys − 0.04, 95% CI (−0.10, 0.01); −0.02, 95% CI (−0.05, 0.01), for girls; and − 0.01, 95% CI (−0.08, 0.06), for both using the random-effects models. However, none of these effects were significant. A significant heterogeneity was detected for the meta-analysis of effect TCS exposure on birth head for total (I^2 = 55.8%, P = 0.045) [Figure 5]. Begg's test and Egger's test revealed no obvious publication bias among these studies; the P values for these tests were >0.05 (P = 0.330 and 0.308, respectively).

Effect of prenatal triclosan exposure on gestational age

The pooled analysis of extracted data from 6 studies[4,6,11,12,22,25] explained that the TCS exposure of 3181 pregnant women and gestational age of their infants showed that TCS exposure was not significantly associated with the gestational age for boys (−0.028, 95% CI [−0.068, 0.012]), girls (−0.028, 95% CI [−0.063, 0.007]), and total (−0.005, 95% CI [−0.017, 0.006]) based on fixed-effects models. Furthermore, there was no significant heterogeneity for them [Figure 6]. The P values for Begg's test and Egger's test were 0.436 and 0.534, respectively. Therefore, there was no publication bias among these studies (P > 0.05).

Effect of prenatal triclosan exposure on anogenital distance

Anogenital distance (AGD) refers to the distance from the anus to the genitals in neonatal as a sexually dimorphic was studied in 2 included studies. The prenatal TCS exposure does not have any association with AGD in girls in both studies, but its effect on reduced AGD at 3 months of age in boys was significant (P < 0.10), as reported Lassen *et al.*[7,27]

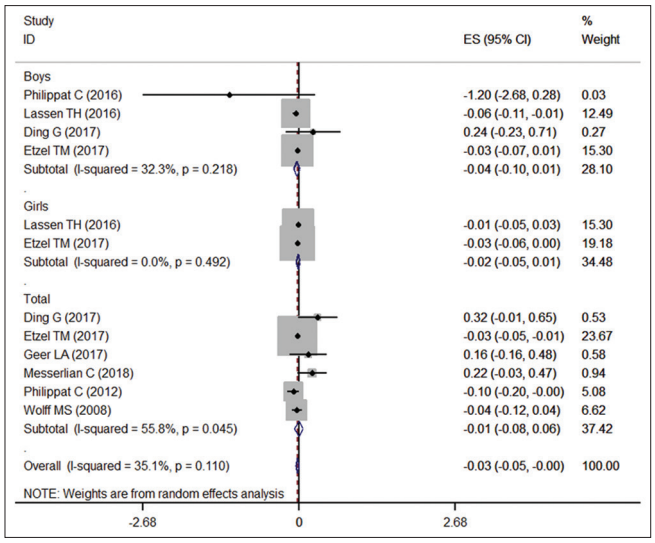

Figure 5: Forest plot of beta-coefficients for the effect of triclosan exposure on birth head by gender

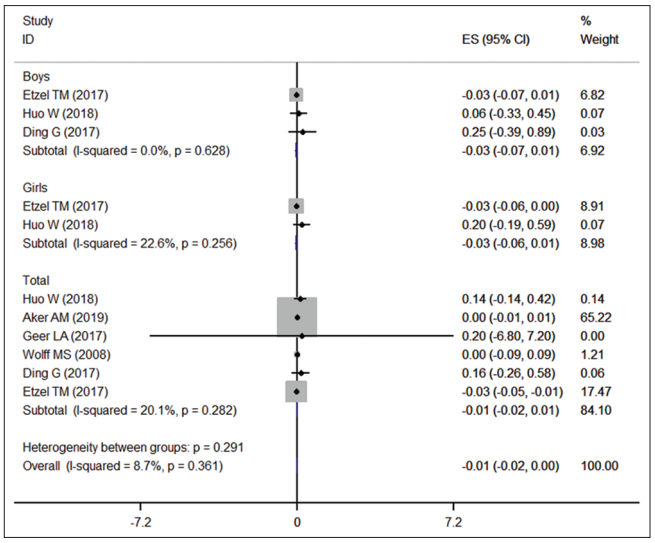

Figure 6: Forest plot of beta-coefficients for the effect of triclosan exposure on gestational age by gender

DISCUSSION

The present study is focused solely on reviewing the studies that have investigated the association of prenatal exposure to TCS with birth outcomes. We performed a comprehensive search of PubMed, Web of Science, and Scopus databases using a well-defined search strategy and with no language and time restrictions applied.

After duplicates removal and studies screening, 15 remained studies were systematically reviewed to determine the association of prenatal TCS exposure with birth outcomes. In all included studies, the maternal TCS urinary concentration was considered as a biomarker of the pregnant women's exposure to TCS.

For accounting the unpublished studies, the publication bias was investigated. The Begg's and Egger's tests for birth weight, birth length, birth head circumference, and gestational age were revealed no obvious publication bias. However, the Begg's and Egger's tests for birth weight *Z*-score were suggested significant publication bias. In addition, trim-and-fill analysis resulted that the publication bias had no significant effect on the obtained results.

Our study revealed the association between maternal TCS exposure and increasing birth weight for boys and girls, but the association was not statistically significant. However, maternal TCS exposure does not have any significant effect on birth weight, length, head circumference, and gestational age.

TCS is a phenol derivative that, unlike other phenolic compounds, is identified as a safe and tolerable compound with low acute toxicity. The main mechanism suggested for describing how TCS can affect the fetal growth is as follows: disrupting the levels of thyroid hormones through increasing their hepatic metabolism.[4,22] The mentioned mechanism is the suggested mechanism based on animal studies.[28,29] The effect of TCS on thyroid hormones is inconsistent, and reported associations in human studies included the positive, negative, or nonexistent association.[8,30-32]

Thyroxin availability is an effective factor on the fetus growth and development, and the fetus is dependent on maternal thyroxin during the first trimester and the function of the fetal thyroid starts after the 12nd week of gestation. However, the fetus gain the most weight during the third trimester of pregnancy. The urine samples collected around the 28th week of pregnancy may be better for the assessment of fetal growth effects. The half-life of TCS is <24 h, and as a short-lived compound, its concentration varies during and across days. This fluctuation is higher in spot urine samples than in long-term samples.[7,22,33] At all included studies in the current review, the spot urine samples that were derived dominantly in the second and third trimesters and rarely in the first trimester were used for exposure assessment. It seems that a single spot urine sample cannot clearly reflect the average of exposure to the TCS during the entire pregnancy. It can be the possible reason for controversial results reported for the association of prenatal exposure to TCS with birth outcomes.

The limitation related to current review are including: the urine sampling in different pregnancy stages in various study and once sampling in most of studies.

CONCLUSION

The present systematic review showed no significant association between maternal exposure to TCS and birth

outcomes. According to obtained results, we recommend the conduction of more studies on TCS detection in diverse biological matrixes (blood, cord blood, urine, and placenta) and in diverse pregnancy stages to evaluate the effect of TCS exposure during pregnancy on birth outcomes. Due to the limitation of these studies, it is wise to limit TCS exposure in pregnancy, especially in the maternal period.

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Conflicts of interest

There are no conflicts of interest.

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Supplementary Table 1: Search strategy in different database

Database	Search strategy	Number of documents
PubMed	(((“triclosan”[Title/Abstract]) OR “triclosan”[MeSH Terms])) AND ((((((((((((((((((((((((((((((“premature delivery”[Title/Abstract]) OR “preterm birth*”[Title/Abstract]) OR “preterm birth” MeSH Terms]) OR “preterm delivery”[Title/Abstract]) OR “gestation* age”[Title/Abstract]) OR “gestation* time”[Title/Abstract]) OR “gestation* length”[Title/Abstract]) OR “gestation* duration”[Title/Abstract]) OR “birth weight”[Title/Abstract]) OR “birth weight”[MeSH Terms]) OR “birthweight”[Title/Abstract]) OR “neonatal weight”[Title/Abstract]) OR “neonate weight”[Title/Abstract]) OR “newborn weight”[Title/Abstract]) OR “weight at birth”[Title/Abstract]) OR “Fetal Macrosomia”[Title/Abstract]) OR “Fetal Macrosomia”[MeSH Terms]) OR “macrosomi*”[Title/Abstract]) OR “newborn overweight”[Title/Abstract]) OR “neonatal overweight”[Title/Abstract]) OR “growth restriction”[Title/Abstract]) OR “growth retardation”[Title/Abstract]) OR “intrauterine growth”[Title/Abstract]) OR “Fetal Growth Retardation”[Title/Abstract]) OR “Fetal Growth Retardation”[MeSH Terms]) OR “fetal growth”[Title/Abstract]) OR “birth size*”[Title/Abstract]) OR “birth outcome*”[Title/Abstract]) OR “obstetric* outcome*”[Title/Abstract]) OR “pregnancy outcome*”[Title/Abstract]) OR “pregnancy outcome”[MeSH Terms]) OR “anogenital distance”[Title/Abstract]) OR “anogenital index”[Title/Abstract]) OR “anal genital distance”[Title/Abstract]) OR “anal genital distance”[Title/Abstract])	31
Web of Science	(TOPIC:(“premature delivery”) OR TOPIC:(“preterm birth*”) OR TOPIC:(“preterm delivery”) OR TOPIC:(“gestation* age”) OR TOPIC:(“gestation* time”) OR TOPIC:(“gestation* length”) OR TOPIC:(“gestation* duration”) OR TOPIC:(“birth weight”) OR TOPIC:(“pregnancy outcome*”) OR TOPIC:(“anogenital index”) OR TOPIC: (“anal genital distance”) OR TOPIC:(“newborn weight”) OR TOPIC:(“anogenital distance”) OR TOPIC:(“Fetal Macrosomia “) OR TOPIC:(“macrosomi*”) OR TOPIC: (“newborn overweight”) OR TOPIC: (“neonatal overweight”) OR TOPIC: (“growth restriction”) OR TOPIC: (“growth retardation”) OR TOPIC: (“intrauterine growth”) OR TOPIC: (“Fetal Growth Retardation “) OR TOPIC: (“fetal growth”) OR TOPIC: (“birth size*”) ORTOPIC: (“birth outcome*”) OR TOPIC:(“obstetric* outcome*”) OR TITLE:(“premature delivery”) OR TITLE:(“preterm birth*”) OR TITLE:(“preterm delivery”) OR TITLE:(“gestation* age”) OR TITLE:(“gestation* time”) OR TITLE:(“gestation* length”) OR TITLE:(“gestation* duration”) OR TITLE:(“birth weight”) OR ITLE:(“pregnancy outcome*”) OR TITLE:(“anogenital index”) OR TITLE: (“anal genital distance”) OR TITLE:(“newborn weight”) OR TITLE:(“anogenital distance”) OR TITLE:(“Fetal Macrosomia “) OR TITLE:(“macrosomi*”) OR TITLE: (“newborn overweight”) OR TITLE: (“neonatal overweight”) OR TITLE: (“growth restriction”) OR TITLE: (“growth retardation”) OR TITLE: (“intrauterine growth”) OR TITLE: (“Fetal Growth Retardation “) OR TITLE: (“fetal growth”) OR TITLE: (“birth size*”) ORTITLE: (“birth outcome*”) OR TITLE:(“obstetric* outcome*”)) AND (TOPIC: (“triclosan”) OR TITLE: (“triclosan”))	43
Scopus	((TITLE-ABS-KEY (“premature delivery”) OR TITLE-ABS-KEY (“preterm birth*”) OR TITLE-ABS-KEY (“preterm delivery”) OR TITLE-ABS-KEY (“gestation* age”) OR TITLE-ABS-KEY (“gestation* time”) OR TITLE-ABS-KEY (”gestation* length”) OR TITLE-ABS-KEY (“gestation* duration”) OR TITLE-ABS-KEY (“birth weight”) OR TITLE-ABS-KEY (“birthweight”) OR TITLE-ABS-KEY (“neonatal weight”) OR TITLE-ABS-KEY (“neonate weight”) OR TITLE-ABS-KEY (“newborn weight”) OR TITLE-ABS-KEY (“weight at birth”) OR TITLE-ABS-KEY (“Fetal Macrosomia”) OR TITLE-ABS-KEY (“macrosomi*”) OR TITLE-ABS-KEY (“newborn overweight”) OR TITLE-ABS-KEY (”neonatal overweight”) OR TITLE-ABS-KEY (“growth restriction”) OR TITLE-ABS-KEY (“growth retardation”) OR TITLE-ABS-KEY (“intrauterine growth”) OR TITLE-ABS-KEY (“Fetal Growth Retardation”) OR TITLE-ABS-KEY (“fetal growth”) OR TITLE-ABS-KEY (“birth size*”) OR TITLE-ABS-KEY (“birth outcome*”) OR TITLE-ABS-KEY (“obstetric* outcome*”) OR TITLE-ABS-KEY (“pregnancy outcome*”) OR TITLE-ABS-KEY (“anogenital distance”) OR TITLE-ABS-KEY (“anogenital index”) OR TITLE-ABS-KEY (“anal genital distance”) OR TITLE-ABS-KEY (“anal genital distance”))) AND (TITLE-ABS-KEY (“triclosan”))	75