Systematic Review

The Effect of Water Intake during Pregnancy on Birth Weight

Pengaruh Asupan Air selama Kehamilan pada Berat Lahir Bayi

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Abstract

Objective: This systematic review aimed to investigate the effect of water intake during pregnancy on infant birth weight.

Methods: A comprehensive search was conducted using the keywords "water intake," "dehydration," "pregnancy," "outcome," "hydration," "birth weight," and "birth outcome" in databases such as "SCOPUS," "EBSCO," "PUBMED," "COCHRANE," and through "Google Search." MeSH headings "pregnancy" and "hydration" were used for the search. Inclusion criteria encompassed pregnant women without pathological disorders, birth weight as a studied outcome, prospective cohorts, clinical trial study designs, and English-language papers. Out of the 254 articles retrieved, six met the specified requirements and were included in this review.

Results: The findings from the six studies consistently demonstrated a positive correlation between higher water intake, improved hydration, and increased birth weight. All studies measured water consumption or hydration status between 8-37 weeks of gestation. Regardless of the duration of the studies, underhydration or low water intake was consistently associated with lower birth weight.

Conclusion: This review highlights that increasing water intake among pregnant women positively affects infant birth weight. Adequate water intake during pregnancy is recommended to be in the range of 2180 – 3000 mL daily, considering hydration status and the stage of pregnancy.

Keywords: birth weight, hydration, pregnancy, water intake.

Abstrak

Tujuan: *Untuk mengungkap pengaruh asupan air selama kehamilan terhadap berat lahir bayi.*

Metode: *Menggunakan kata kunci "water intake," "dehydration," "pregnancy," "outcome," "hydration," "birth weight," dan "birth outcome,", artikel dicari. Data diambil dari database "SCOPUS," "EBSCO," "PUBMED," "COCHRANE," dan "Google Search". Kami menggunakan MeSH headings kehamilan dan hidrasi untuk istilah pencarian. Kriteria inklusi adalah perempuan hamil tanpa kelainan patologis, berat badan lahir adalah salah satu luaran penelitian, desain studi berupa kohort prospektif dan uji klinis, serta artikel dalam bahasa Inggris. Dari 254 artikel yang diperoleh, enam artikel memenuhi persyaratan dan digunakan untuk review ini.*

Hasil: *Dari keenam penelitian menunjukkan bahwa semakin tinggi asupan air, semakin baik hidrasi atau asupan air meningkatkan berat bayi lahir. Semua penelitian mengukur konsumsi air atau status hidrasi antara 8-37 minggu. Studi-studi ini secara konsisten memberikan bukti bahwa asupan air yang rendah atau kondisi kekurangan cairan dikaitkan dengan berat badan lahir rendah, terlepas dari durasi studi.*

Kesimpulan: *Kajian ini menunjukkan bahwa peningkatan asupan air ibu hamil berpengaruh positif terhadap berat lahir bayi. Asupan air yang cukup pada ibu hamil adalah 2180 – 3000 mL setiap hari bergantung pada status hidrasi dan usia kehamilan.*

Kata kunci: *asupan air, berat lahir, hidrasi, kehamilan.*

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INTRODUCTION

Water is an essential nutrient crucial for maintaining proper metabolic function, hydration, and overall health, especially for the fluid balancing system.[1] Intrauterine growth and development represent the most vulnerable phases of the human life cycle, with profound implications on later life resulting from developmental abnormalities during this period. Fetal brain development throughout pregnancy heavily relies on maternal nutrition and behavior, and the mother's physiological and metabolic adaptations during pregnancy can significantly impact fetal development.[2,3] During pregnancy, plasma volume gradually rises, with most of the 50% gain occurring around the 34-week mark of gestation, which is proportional to birth weight. However, as plasma volume increases more rapidly than red blood cell (RBC) mass,[4] hemoglobin concentration, hematocrit, and RBC count decrease. Maintaining a proper balance of amniotic fluid throughout pregnancy is vital for fetal health, and a lack of amniotic fluid, known as oligohydramnios, can lead to various negative effects during pregnancy.[5] A previous systematic review determined the recommended daily water intake increase for pregnant women with oligohydramnios to enhance the amniotic fluid index (AFI).[6] During the first trimester, amniotic fluid primarily consists of water and electrolytes, with negligible protein content. The flow and volume of amniotic fluid in the second and third trimesters are influenced by hydrostatic and osmotic pressure.[7] Full-term newborn infants contain approximately 70-80% of their body weight as water. The body's increased demand for water during pregnancy is due to factors such as the rise in blood volume, amniotic fluid production, and fetal circulation, and this demand can be influenced by maternal activity, ambient temperature, and environmental factors.[8] The American Institute of Medicine recommends a fluid consumption of 2.7 liters per day for pregnant women, while the Ministry of Health and the Indonesian Association of Obstetrics and Gynecology (POGI) suggest a range of 2450 - 2650 mL or approximately 8-10 glasses per day for pregnant women.[9]

Several studies have addressed the impact of water intake on birth outcomes, with a focus on how contaminants affect the results. High tap water consumption (>35 glasses per week) has not been significantly associated with small gestational age (SGA) or preterm delivery (PTD) in Aggazzotti's studies (ORs = 1.0 and 1.1, respectively).[10] In contrast, increased bottled water consumption has been linked to a lower incidence of spontaneous abortion and heart abnormalities.[11] However, drinking more water has been associated with a higher risk of PTD and low birth weight.[12] Low birth weight (LBW) is defined by the Indonesian Pediatric Society as a weight at birth of less than 2500 grams.[13]

Despite the importance of pregnancy-related hydration studies, there is still a lack of research in this area. A systematic review of the literature on the role of water intake on birth outcomes, particularly infant birth weight, has not been conducted yet. Considering that low birth weight can have both short-term and irreversible long-term effects, this systematic literature review was compiled to determine the role of water intake during pregnancy on infant birth weight and prevent the incidence of low birth weight infants from the beginning of pregnancy.

METHODS

The following conceptual framework and hypotheses serve as the foundation for this review: Does drinking water during pregnancy affect the infant's weight at birth? (Figure 1). This review process, which included studies using numerical data, was a systematic quantitative review. Prior to inclusion and analysis, studies were evaluated for quality. Quality appraisal was conducted using CASP (Critical Appraisal Skills Programme) Checklist for appropriate study design reported. The checklist included questions on research questions, methods, and analysis techniques used to assess the validity of results.

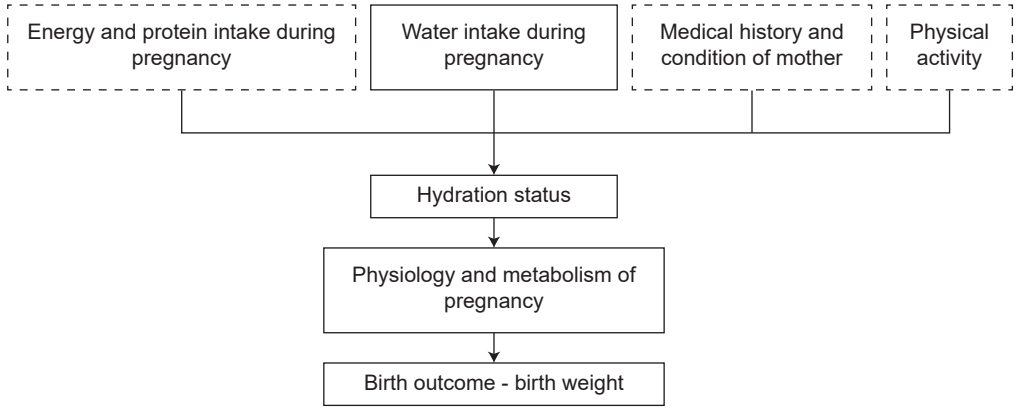

Figure 1. Conceptual Framework

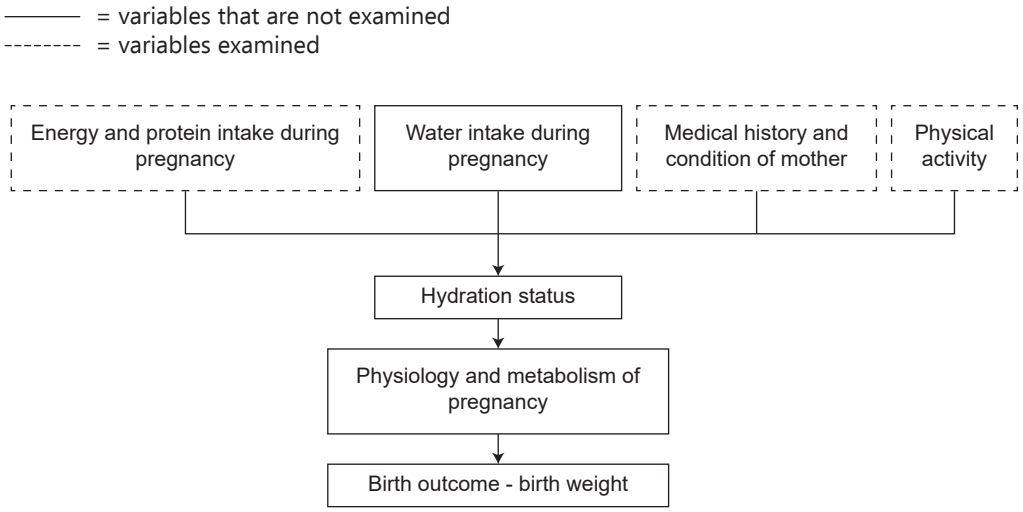

Figure 2. PRISMA Flow Diagram

Design, location, and time

This systematic review followed PRISMA principles. The study's steps included eligibility requirements, information sources, study selection, method of data collection, and data item selection, which are the first five factors (Figure 2).[14] The information was primarily sourced from secondary sources, mainly findings from other study projects. The authors ensured that the predetermined inclusion criteria were met by the data sources. The initial inclusion criteria (IC1) consisted of studies that were original, peer-reviewed, and published in English during the previous 15 years (2007-2022). The second step of inclusion criteria (IC2) involved pregnant women without any comorbidities, and the studies were either clinical trials or prospective cohorts.

Study Selection

The studies selection process consisted of the following four steps. Data were found using the search terms "water intake," "dehydration," "pregnancy," "outcome," "hydration," "birth weight," and "birth outcome" in the databases "SCOPUS," "EBSCO," "PUBMED," "COCHRANE," and "Google Search." Based on the eligibility criteria, the titles, abstracts, and keywords of the found papers were investigated and chosen (Phase 1).

Based on the eligibility requirements, the remaining papers were either fully or partially read to determine whether or not they should be reviewed. Starting with Phase 2, the reference lists of the papers were investigated to find related studies.

The authors carried out these steps collaboratively in an iterative assessment procedure. Any disagreements were discussed among the authors until a consensus was established. This review's summary table was compiled manually using information collected from the studies included in the review. A data extraction form was used, including fields for the journal, year, study setting, participants, study methods, study outcome, and conclusion.Each writer surveyed what they considered the most relevant existing literature, and both the entire text and the retrieved data were reviewed during the evaluation process. Any disagreements between the authors were resolved through conversation. Out of the 254 articles resulting from the search, six articles met the inclusion criteria (Table 1).

Table 1. Search Strategies

Databases	Search strategies	Found	Used
SCOPUS	*"hydration pregnancy" [MeSH Terms] OR ("pregnant"[All Fields] AND "birth outcome" [All Fields]) OR " birth weight" [all fields]*	55	1
EBSCO	*"hydration pregnancy" [MeSH Terms] OR ("pregnant"[All Fields] AND "birth outcome" [All Fields]) OR " birth weight" [all fields]*	8	0
PUBMED	*"hydration pregnancy" [MeSH Terms] OR ("pregnant"[All Fields] AND "birth outcome" [All Fields]) OR " birth weight" [all fields]*	98	2
COCHRANE	*"hydration pregnancy" [MeSH Terms] OR ("pregnant"[All Fields] AND "birth outcome" [All Fields]) OR " birth weight" [all fields]*	10	0
Google search	*Hydration pregnancy and birth weight, hydration pregnancy and birth length, hydration pregnancy and birth outcome, water intake in pregnancy*	83	3

RESULTS

Six papers were accepted for the journal analysis because they met the prerequisites. Each of these six studies is briefly discussed in Table 2, highlighting their respective strengths, weaknesses, methodology, sample size, interventions, and outcomes. The main focus of these studies was to explore the relationship between maternal hydration and delivery outcomes. Notably, all six studies found a positive association between better hydration or increased water intake and higher birth weight. The assessment of water consumption or hydration status in these studies was conducted between 8-37 weeks of pregnancy. Three studies determined hydration status using urine biomarkers, while five studies collected data on water consumption. Importantly, all subjects in these studies had no pathological conditions.The consistent evidence provided by these studies indicates that low water intake or underhydration during pregnancy is associated with lower birth weight, irrespective of the duration of the studies. Based on the results of this review, it is clinically recommended to pay attention to the adequacy of water intake for every pregnant woman, as it significantly affects birth weight. However, further research is still required to explore the optimal amount of water intake, the timing, and the duration of adequate water intake during pregnancy. Additionally, it is advisable to regularly check the hydration status of pregnant women during antenatal care to ensure proper maternal and fetal health.

Table 2. Descriptive analysis of trials included in the systematic review

Authors and year	Study Setting	Method	Results	Conclusion
Wright et al., 2010[15]	A prospective cohort studies including 2766 expectant women was carried out between December 2000 and May 2004 at three study locations in the US. Pregnant (within 12 weeks of gestation) or intending to become pregnant is acceptable inclusion criteria. Women at least 18 years old intended to give birth in the studies area and did not get any reproductive treatments during the pregnancy.	Prior to 16 weeks of pregnancy, (baseline interview) and between 20 and 24 weeks of pregnancy (interview period), telephone interviews were used to gather information on exposures (including water intake) and potential confounding factors (follow-up interview). Comparing water intake ≤ 5 1 ounces/day (≤1508 mL) over >51 ounces/day	The adjusted mean birth weight was 27 (95% [CI]: -34, 87] grams higher for the top three total water consumption quartiles (> 51-78], > 78-114], and > 114 ounces/day) compared to the lowest quartile (51 ounces/day). Bottled water, cold tap water, and overall tap water consumption all had similar adjusted birth weight values. Both preterm delivery and SGA, which increased total and tap water intake, did not show an exposure-response gradient. Nonetheless, all three higher quartiles of SGA had adjusted relative risks that were less than 1.00. (range: 0.6-0.90).	After adjusting for confounders, these findings imply that increasing water intake may be linked to higher mean birth weight.
Akter et al. 2012	Sixty-four pregnant women between the ages of 32 and 35 weeks gestation participated in a randomized controlled trial to ascertain the impact of maternal oral water intake on the oligohydramnios amniotic fluid index (AFI) 5.	The studies participants were all females and were randomly split into two groups. Group A (the intervention group) women were instructed to drink two liters of water within two hours and then two more liters daily for seven days. Women in Group B (the control group) were allowed to consume water frequently. AFI was evaluated in both groups after oral hydration treatment for two hours, twenty-four hours, and seven days.	Grup A (intervention) = Normal 71%, Sectio 29%, LBW 12.5% Grup B (control) = Normal 21.8%, Sectio 78.2%, LBW 81.25% The foetal outcome was healthy in 87.1% vs. 59.4% of the intervention and control groups, asphyxiated in 12.9% vs. 50%, and perinatal death was 3.22 vs. 21.8%. 6.3% of the infants in the control group were stillborn.	Maternal oral hydration therapy considerably improves the fetal prognosis, lowers the rate of cesarean sections, and raises the AFI.
Ernawati et al. 2017	A prospective cohort studies at the Jagir Health Center in Surabaya included 34 healthy newborns and healthy pregnant women in the third trimester, aged 20 to 35. Pregnant women between the ages of 20 and 35, singleton pregnancies, the third trimester (28 to 42 weeks gestation), anamnesis-declared good health, physical examination, normal third-trimester ultrasound, BMI (18.5 to 29.9 kg/m2), at least one year of residence in Surabaya, at least a high school diploma, and a willingness to participate in the study were the inclusion criteria for this study.	A seven-day fluid intake log was put into place.	Fluid consumption positively correlated with birth weight in pregnant women throughout the third trimester (r: 0.469 p: 0.005). In Surabaya's Jagir Health Center, the frequency of LBW is 14.7%. The average amount of water consumed was 746.12±401.29 mL. Minimum 302 mL, maximum 2276 mL.	There was a positive correlation between fluid intake and birth weight.
Mulyani et al., 2018	From December 2016 to January 2018, 66 pregnant women aged 18 to 35 who were in their second trimester (more than 12 weeks along) were enrolled in a prospective cohort study. Participants were drawn from seven health centers (Puskesmas) in Kebon Jeruk, West Jakarta. The following requirements must be met in order to be included in the study. received antenatal treatment at the study site's health center; were in the second trimester (>12–24 weeks); were in good health (no secondary infections), No prior cesarean section experience and history of never giving birth to a child under 48 cm tall and with low birth weight. 150 to 165 cm tall; BMI of 18.5-25.0 intend to give birth at the medical facility	Blood and urine samples were taken six times: three times at 32–34 weeks and three times at 35–37 weeks. The hydration status was evaluated between 32 and 37 weeks. The newborn's birth weight and length (parturition stage) were measured at the time of delivery. The degree of hydration was evaluated using five biomarkers: urine color, urine osmolality, urine specific gravity, serum osmolality, and serum sodium. Based on the earlier biomarkers, subjects were split into dehydrated (DG) and normal (NG); 51.5% were in the DG and 48.5% were in the NG, respectively.	Water intake levels in DG were 72.53±14.41% lower than in NG (118.68±14.37%). The reported difference in child birth weight, length, chest circumference, and head circumference were 491.84 g, 0.98 cm, 0.98 cm, and 1.11 cm, respectively, with infants from the NG having greater measures than infants from the DG. When controlling for water intake, the DG infant birth weight and length (2,798.5397.85 g; 47.320.32 cm) were lower than the NG (3,371.77102.60 g; 49.090.33 cm). The acknowledged difference between the two groups in infant birth weight and length was 596.1 g and 1.8 cm, respectively.	The influence of pregnant women's hydration state on birth weight was studied after correcting for possible confounders. Pregnant women should keep track of their weight and have a basic checkup to determine their hydration condition (urine color) and prenatal care. Pregnant women should carefully manage their nutritional and water consumption to get at least 3.0 L of water daily.
Mulyani et al. 2021	Thirty-eight pregnant women in their second trimester who participated in a prospective cohort study were investigated. Doing a pregnancy examination at the study location is a requirement for inclusion. second and third trimesters; . according to the medical report, in good health (no secondary infection); was never underweight at birth or short (less than 48 cm); aged 18 to 35 years; being between 150 and 165 cm tall; body mass index (BMI) of 18.5-25.0; planned to deliver at the study site; never had a cesarean delivery.	Direct measurements and interviews were used to collect the data used to characterize the subjects. During the third and fourth trimesters of pregnancy (weeks 32–34 and 35–37), the mother's hydration status was evaluated by collecting urine and blood samples. Food recollection was used to gauge food intake, whereas anthropometric measurements were taken 30 minutes after birth to gauge birth weight and length.	In all, 52.6% of pregnant individuals developed dehydration. There are disparities between dehydrated and normal mothers' water consumption. The neonates of the two groups of pregnant mothers had different body weights, lengths, head circumferences, and chest circumferences.	Birth weight, length, and head and chest circumference varied by 500.6 g, 0.4 cm, 0.8 cm, and 1.4 cm between the two groups, respectively, suggesting a positive relationship between hydration status and pregnancy outcome.
Rosinger et al. (2021).	A randomized control trial study design among 27 overweight/obese pregnant women. Inclusion criteria; aged 18 to 40; pregnancy BMI of 25 to 45 kg/m2; singleton pregnancy with a gestational age of 8 to 12 weeks. The physician's approval for participation Multiple pregnancies, diabetes at screening, and other factors are excluded. Severe allergies or dietary restrictions, BMI outside the overweight/obese range; Restrictions on exercising during pregnancy	Fourteen women got standard treatment; 13 also received weekly counseling on diet, physical activity, water intake (64 oz = 1894.4 mL), and health-promoting activities. Using nocturnal urine osmolality (Uosm), hydration status was assessed weekly in pregnant women between the ages of 8 and 36 weeks; underhydration was categorized (Uosm500 mOsm/kg). The birth weight, length z scores, and percentiles were standardized for gestational age and sex. Both mixed-effect and linear regression tests were run.	Exploratory studies reveal that underhydration was related to birth weight, but not length, in different ways in the second and third trimesters. A lower birth weight z score (B= 0.32 z score, SE=0.13; p=0.024) and percentile (9.3%, SE=3.3; p=0.012) were substantially correlated with each ten percentage point increase in the proportion of time a woman was dehydrated throughout the second trimester. In contrast, the birth weight percentile was positively correlated with each ten percentage point rise in third trimester dehydration (B = 7.45%, SE = 3.3, p = 0.038). The percentile or z-score of birth length did not correlate with the percentage of dehydration.	Preliminary evidence from this study suggests that a higher percentage of time spent being dehydrated during the second trimester of pregnancy may be associated with lower birth weight. Pregnant women should drink 300 ml more water each day. The fetal body needs 500 mOsm/kg Uosm for optimal development.

In this review, two studies utilized an RCT study design. The first study compared a standard care group with a daily water intake group of pregnant women (64 oz = 1844 ml). The intervention group also received education on nutrition and physical activity. This study revealed that the longer the duration of underhydration, the lower the birth weight of infants.[16]

The second RCT study instructed individuals in their third trimester of pregnancy to drink 2 liters of water within 2 hours and an additional 2 liters per day for seven days. The intervention group had a higher rate of normal vaginal deliveries (71.0%) compared to the control group

(21.8%). Conversely, the intervention group had a lower rate of cesarean deliveries compared to the control group (29.0% vs. 78.2%). Additionally, the percentage of low birth weight infants was significantly lower in the intervention group (12.5%) compared to the control group (81.25%).[17]

The design of a prospective cohort study was utilized in the other four studies. One of these studies used a bivariate approach for analysis, while the other three employed multivariate analysis. All four studies examined different aspects of nutrient intake and its relationship to pregnancy outcomes, as outlined in Table 2. Overall, this review demonstrates that there are significant variations in pregnancy outcomes as determined by anthropometric assessment, particularly birth weight. The studies show that infant birth weight and length are negatively impacted when hypohydration is present ($p<0.05$).[18] Another study found a positive correlation between hydration status and pregnancy outcome based on the difference in birth weight between the two groups, with a weight difference at birth of 500.6 g. [19] Based on the findings from this review and the Indonesian Society of Obstetrics and Gynecology, it is recommended that pregnant women should routinely monitor their health, including body weight, and assess their hydration status. Adequate water intake for pregnant women is suggested to be in the range of 2180 – 3000 mL daily, depending on hydration status and the stage of pregnancy. [20]

DISCUSSION

Water intake is derived from both solid food (around twenty percent) and fluids, including drinking water (about eighty percent). [21] Maintaining proper hydration is essential, and urine osmolality serves as an indicator of hydration status. [22, 23] To reduce the risk of complications during pregnancy, maintaining a healthy level of nutrient consumption, especially water, is crucial throughout the entire pregnancy.

Around 32 weeks of pregnancy, fetal weight gain accelerates, peaking at 34 weeks. Fetal development slows at weeks 34-36 due to limited uterine space. However, additional uterine development occurs dramatically within the first six months following birth, especially in the first eight weeks. [24] During late pregnancy, mothers may feel full and have a reduced appetite for eating and drinking due to increased fetal growth. Nevertheless, adequate nutrients and water are required for fetal development.

Hydration is essential for maintaining appropriate body temperature and blood pressure, as well as for the digestion, absorption, and transportation of essential nutrients into cells. Hydration signals cells to create energy, allowing the body to carry out its functions, and helps eliminate waste products of metabolism and chemical processes in the cells. [25, 26] The quantity and quality of nutrients consumed play a role in the occurrence of low birth weight. [12] An efficient hydration system helps cells absorb the highest possible quality and quantity of nutrients.

Pregnant women need hydration for various reasons, including maintaining amniotic fluid balance, which is crucial for fetal health. Oligohydramnios, or amniotic fluid shortage, can have several effects on the pregnancy's prognosis. This condition affects around 3-5% of subsequent pregnancies and can be caused by factors such as membrane rupture, placental insufficiency, congenital defects, and other medical conditions. [5, 27, 28] Previous studies have demonstrated that inadequate water intake can affect amniotic fluid index (AFI), and sufficient water intake may increase AFI. [29]

A higher proportion of dehydrated urine samples was associated with a lower birth weight when tested in the second trimester.16 The findings from this study are significant because of the increased demand for water during pregnancy and the widespread failure of pregnant women in many parts of the world to consume enough amounts of water.[9,30,31] Although water consumption appears to be highest in the second trimester and lowest in the third[6,7], When morning sickness and nausea begin to fade in the second trimester, it removes one potential barrier to exercise. Suppose that women exercise regularly throughout the second trimester. In such a situation, the person might produce more water than usual, which could increase the danger of dehydration if it is not properly supplied by fluid consumption.

The transport of fluid from the amniotic fluid to the circulation of the fetus through the mechanism of hydrostatic and osmotic pressure is a vital part of the circulatory system and the management of amniotic fluid volume in the second and third trimesters of pregnancy. Because fluid consumption encourages fetal circulation, the production of amniotic fluid, and blood volume, will increase during pregnancy. The fluid demand is influenced by numerous variables, including

maternal activity, the surrounding environment, and where people live.[8] In previous studies, the average fluid consumption of pregnant women in their third trimester was 746.12 mL, far below the recommended amount.[32] According to the studies, the association between fluid consumption and birth weight was statistically significant ($p<0.005$). The overall change in fetal water and protein levels became proportional to the birth weight. The average birth weight is believed to contain 2400 g of water and 400 g of protein. Throughout pregnancy, the quantity of water often falls, reversing the rise in protein, fat, and minerals. It is vital to pay more attention to pregnant women's nutrients and water consumption to support fetal growth and development. Water is essential for sustaining the body's metabolic activity and contributes to cell-volume homeostasis. Variations in cell volume significantly affect the regulation of nutritional intake and metabolic waste, as well as cell metabolism and gene expression.[33–35]

The weaknesses of this review are the limited numbers of studies, small sample size, various methods in water intake data collection, and various length of intervention. Regardless the weaknesses, there is also strengths of the study such as the study design are RCT and cohort, standardized LBW measurements, and based on recent publications.

Low birth weight is common worldwide with the prevalence of 15-20% of 20 million births yearly.[36] LBW is a condition that needs attention because it can cause short-term and long-term effects, such as infant mortality, stunted growth, cognitive impairment, and abortion.[13] In children aged 0 to 60 months, being LBW is estimated to increase the incidence of stunting up to 3.64 times more frequently than not being LBW (OR = 3.64; 95% CI = 2.70), according to primary studies carried out in Ethiopia, Brazil, and Indonesia.[37] However, this disorder may have long-term consequences like an increased risk of diabetes and cardiovascular disease.[36] The many short-term and long-term effects of LBW indicate the need for prevention since pregnancy, one of which is regulating pregnant women's fluid intake.[38] Meanwhile, this study results showed that increasing in water intake on pregnant women improve the infant birth weight. These implies that the important health authority in each country to promotes adequate water intake for pregnant women.

CONCLUSIONS

In conclusion, this review has demonstrated a significant association between specific measures of water intake and the risk of adverse pregnancy outcomes, particularly birth weight. The optimal range of water intake associated with increased birth weight was found to be between 2180 - 3000 mL. The review has also established a positive correlation between fluid intake and birth weight. Thus, pregnant mothers should not only focus on nutrient intake and weight gain but also pay attention to their fluid intake to support their health and promote fetal growth. For future research, it is recommended to conduct longitudinal studies with larger sample sizes and consider additional factors like energy intake and other potential risk factors in the analysis. Replicating the findings on the relationships between hydration status and birth outcomes is crucial as it may have important implications for maternal hydration status in the long term. By gathering more comprehensive data and considering a broader range of factors, we can gain deeper insights into the impact of hydration on pregnancy outcomes, ultimately contributing to better maternal and fetal health.

DISCLOSURES

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Conflict of interest

There is no conflict of interest in this present study.

Author contribution

All authors have contributed to all processes in this review, including preparation, data gathering and analysis, drafting and approval for publication of this manuscript.

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