

Nutrition Status of Obstetric Outcomes in Pregnancy

Khoirunnisah Hasibuan^{1*} and Sri Ratnaningsih²

¹Master Program in Midwifery Science, University of 'Aisyiyah Yogyakarta, Indonesia

²Master Program in Midwifery Science, Health Science Faculty, University of 'Aisyiyah Yogyakarta, Indonesia

*¹khoirunnisahhasibuan14@gmail.com, ²ratna_ningsih@unisayogya.ac.id

Abstract

Nutritional status is the reflection of the nutrition adequacy, this is one of the important parameters in assessing the growth and of health condition and is the indicators in measuring the success in fulfilling nutrition for mother during the pregnancy. The food needs is seen not only in the portion eaten, but also must be determined on the quality of nutrients contained in the food consumed. This paper reviews the evidence associated with the outcomes of obstetric nutritional status in pregnancy in LMICs. It uses the framework of Arskey and O'Malley, the focus of the review is determined, the search for articles with relevant database (PubMed, Science Direct and Wiley. Select relevant study by using some inclusion and exclusion criteria and conducting critical appraisal in order to assess the quality of the article, data extraction, data compilation, summarize and report the result. Twenty articles were selected according to inclusion criteria had Grade A and B, two main themes were found from the result of the study; negative outcomes of excess and nutritional deficiencies in pregnancy for mothers and infants. In conclusion, the research results from articles used in scoping review show that most articles are on birth outcomes due to deficiency and excess nutrition in mothers in pregnancy which are the largest outcome, low birth weight (LBW), infant weight > 4000 gram/ macrosomia, and babies with premature births. In addition, negative outcomes of excess and nutritional deficiencies in pregnancy also occur to mothers, that is that most mothers are obese or have high insulin levels.

Keywords: *outcomes, nutritional status, pregnancy, weight gain*

1. Introduction

Pregnancy is a continuous stage, so a deficiency in a period will have a different impact on pregnancy outcomes [1]. Nutrient intake during pregnancy is a reflection of the adequacy of nutrients which is one of the important parameters in assessing growth and health conditions [2]. Food is seen not only in the portion eaten but must be determined on the quality of nutrients contained in the food consumed [3].

The World Health Organization (WHO) in 2015 estimated the maternal mortality rate worldwide at 303,000, almost all deaths this (99%) occurs in Low Middle Income Countries (LMIC) countries, efforts to reduce maternal mortality are highly dependent on ensuring that women have access to quality care before, during and after delivery [4]. To determine appropriate recommendations for weight gain good or in accordance with IOM standards, namely: body weight less (BMI <18.5kg / m²), normal weight (BMI 18.5–23.9kg/m²), overweight (BMI 24.0-27.9kg/m²) or obese (BMI ≥28.0kg/m²), as a review for determining interventions adequacy of proper nutrition [5].

Meeting the nutritional needs in terms of quantity and type is very important with the fulfillment of nutritional needs, the baby will grow according to the age. Nutritional disorders early in life will affect the quality of the next life [6]. Various studies have shown that nutrition plays a major determinant of the first day of life. Maternal nutritional

status is an important role that must be considered during the pregnancy stage, as one of the main determinants of the quality of human resources, especially since the first 1,000 days of life, during pregnancy until the age of 2 years old baby, nutritional needs during pregnancy are of great concern to the mother [7].

2. Methodology

Scoping review is a literature review that aims to explore the breadth of available evidence by mapping the concepts that underlie the research area, the sources of evidence, the types of evidence available. This review is: identifying research questions, identifying relevant articles, selecting articles, charting data and compiling, summarizing and reporting results [8].

1. Identifying Research Questions

To identify scoping review questions and to develop a search strategy used in the Population, Exposure, Outcome, Study Design (PEOS) framework. The use of PEOS helps in identifying key concepts in the focus of the review, developing appropriate search terms to describe the problem, determining inclusion and exclusion criteria so that PEOS is judged appropriate for use [9]. The focus of review questions is shown in Table 1.

Table 1. Research Question Framework

P (Population)	E (Exposure)	O (Outcomes)	S (Study Design)
Pregnancy Pregnant Perinatal Prenatal Antenatal Gestational	Nutrition* Nourishment Diet Food	Impact Effect Outcomes Influence	All research studies/study design related to the Outcomes of Maternal Pregnancy

2. Identifying Relevant Articles

This stage identifies relevant studies by developing a decision plan to find where, terms used, which sources to look for, time span, and language. The first step, article search strategies are developed using relevant databases. The database used is PubMed, Science Direct and Wiley. Second steps determine the inclusion and exclusion criteria (can be seen in Table 2). The third step, literature search is carried out by determining keywords that are designed and focused on the framework, expanded by determining synonyms through Thesurus and Boolean (can be seen in Table 3).

Table 2. Inclusion and Exclusion Criteria in article selection

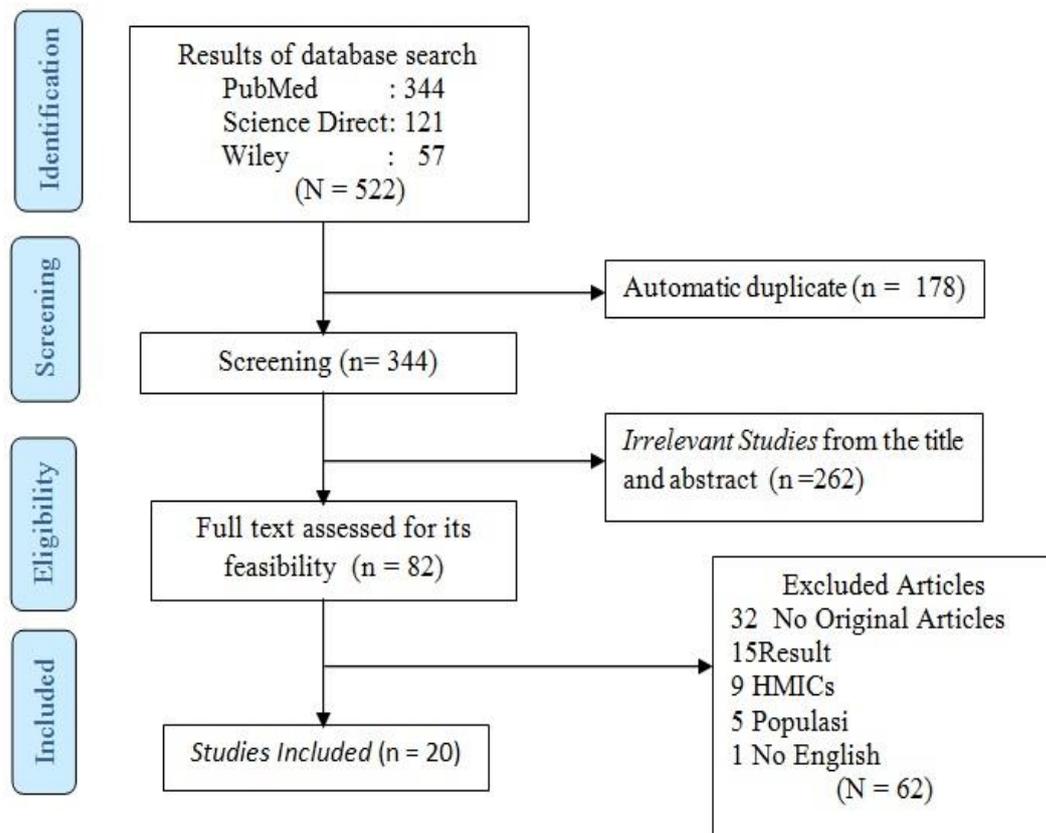
Inclusion Criteria	Exclusion Criteria
Articles published in 2009-2019	Articles published in < 2009 - > 2019
Articles in Indonesian language or English language	Articles in the language except Indonesian and English
Original Research	Opinion Articles/Review Articles/ Report/Book / Encyclopedia / Critical Article
Low Middle Income Countries (LMICs)	High Middle Income Countries (HMICs)

Table 3. Keywords used in searching the articles

(Pregnancy) OR (Pregnant) OR (Perinatal) OR (Prenatal) OR (Antenatal) OR (Gestational) AND (Nutrition) OR (Nourishment) OR (Diet) OR (Food) AND (Impact) OR (Effect) OR (Outcomes) OR (Influence)*

3. Article Selection

From three databases search 522 articles were found, the PubMed database indexed 344 articles, the Science Direct database 121 articles and the Wiley database indexed 57 articles and then filtered by looking at duplicates, abstracts and irrelevant titles and Full Text Reading adjusted to the criteria inclusion found 10 articles that will be conducted Scoping Review, then will be carried out critical appraisal using the Critical Appraisal Tool by Joana Briggs Institute (JBI). The findings of the number of articles and filter process are described in PRISMA Flowchart. The stages of data filtering are presented in Figure 1 as follows.



4. Data Charting

Based on the 20 articles that have been selected, charting data is then performed to classify several points or parts of the article such as the author, the purpose of the study, research design, the number of samples, and the results or findings of the study. Charting data can be seen in Table 4.

Table 4. Data Charting

No.	Author	Country	Purpose	Method	Participant	Findings
1	Perichart-Perera et al., 2017	Mexico	Explain the effects of maternal metabolic risk	Prospective Cohort Study	Samples taken were 177 pregnant women with	Pregnant women who gain excess body weight

			with severe inflammation and birth weight results		gestational age <14 weeks	significantly cause higher insulin levels in pregnant women (p = 0.02).
2	Pan et al., 2016	China	Nutrition surveys to determine maternal nutrition that has a relationship between the incidence of maternal BMI before pregnancy and adverse pregnancy outcomes.	Cohort study Population and Prospective Based	536098 pregnant women from 2120131 is evaluated	Nutritional deficiencies cause adverse pregnancy outcomes
3	Alzineth et al., 2019	Brazil	Evaluation to determine the incidence of anemia with weight gain every week, vitamin A deficiency, and blood pressure levels in the last trimester of pregnancy	Prospective Study	pregnant women less than 20 weeks gestation	Being overweight is associated with higher blood pressure values at the beginning of the last trimester
4	Camey et al., 2010	Brazil	To illustrate the adequacy of weight gain during pregnancy and its relationship to pre-pregnancy nutritional status and other factors	Prospective Cohort Study	Samples from 780 consecutive pregnant women were included	From this research study obtained relevant results from maternal nutrition during pregnancy with the incidence of weight gain that is not appropriate during pregnancy
5	Vo et al., 2019	Vietnam	Investigate the relationship between pre-pregnancy BMI, pregnancy GWG and 12-month PPWR in a group of	Prospective Cohort Study	Of 2030 pregnant women and a final sample of 1666 at 24-28 weeks of gestation	Underweight before pregnancy and excessive GWG have results that cause greater weight retention for up to twelve

			Vietnamese mothers			months postpartum
6	Schneider et al., 2019	Brazil	Evaluate the increase or decrease in BMI of pregnant women with neonatal obstetric outcomes	Retrospective Cohort Study	Pregnant women over the age of 18 information is collected from maternal hospital screening, between November 2016 and March 2017	An increase in BMI above the normal pattern shows a significant relationship with an increase in neonatal weight.
7	Wang, Ding and Wu, 2018	China	Determine the BMI and GWG before pregnancy of neonatal weight in women with GDM	Prospective Cohort Study	Of the 622 single pregnant women diagnosed with GDM medical records of university teaching hospitals	Overweight pregnant women and hyperglycemia in GDM mothers can influence macrosomia
8	Claudia et al., 2019	Brazil	To investigate the relationship between maternal anemia and LBW	Prospective Cohort Study	The minimum sample taken was 618 pregnant women	From the results of studies found that anemia is one of the causes of birth outcomes with the incidence of inadequate baby weight
9	Woldeamanuel et al., 2019	Ethiopia	Assess maternal measurement results in birth weight of infants	Cross Sectional Study	337 pregnant women at Butajira Referral Hospital met the inclusion criteria.	Nutritional status of pregnant women has a significant relationship with hemoglobin levels.
10	Zhao et al., 2017	China	Does the weight gain of pregnant women have a differential effect on birth weight results in women with different BMI before pregnancy	Cross Sectional Study	HealthCare Hospital with 1617 births and their mothers included in the latest study.	Abnormal maternal BMI pre-pregnancy and during pregnancy are at risk for poor birth weight results.

11	Lumbanraja, Lutan and Usman, 2013	Indonesia	To describe maternal weight gain during all trimesters of pregnancy and its correlation to birth weight	Cross sectional study	104 eligible pregnant women and most subjects aged 20-35 years and 38 weeks of gestation	The second and third trimesters shows a statistically significant difference with the birth weight of the baby
12	Zhang et al., 2018	China	To investigate whether prenatal iron and folic acid supplementation in urban and rural Northwestern Chinese women against neonatal birth weight results	Cross Sectional Study	All pregnant women aged between 15 and 49 from 10 urban areas and 20 rural areas in Shaanxi Province, Northwestern China	Significant differences in infant birth weight in urban and rural areas in Northwest China due to maternal nutritional status
13	Kumari et al., 2019	India	Investigate whether women with anemia have a risk of giving birth to PTB and LBW	Cross Sectional Study	515 subjects registered the interview by trained technical staff with data collection	Pregnancy anemia has a risk of PTB and LBW
14	Zhao et al., 2017	Argentina	To evaluate the relationship of maternal nutritional status before and during pregnancy with neonatal outcomes	Cross Sectional Study	604 samples of mother-child pairs were taken who meet the inclusion criteria	Obesity mothers before pregnancy correlate neonatal fat mass
15	Leul et al., 2019	Ethiopia	Determine nutritional status and understanding about NTD problems and the use of FA in maternal who deliver babies NTD	Cross Sectional Study	Participants were selected as many as 617 and randomly selected	This study shows that none of the study participants understood that NTD was a serious health problem related to FA deficiency
16	Gou et al., 2019	China	This study aims to look at pregnancy outcomes among pregnant women with	Retrospective Study	Samples taken were 1523 who met the inclusion criteria	overweight and underweight requires control in GDM women to reduce the side effects of

			GDM due to weight gain			pregnancy results.
17	Paula, Sato and Fujimori, 2012	Brazil	Evaluate the need for adequate nutrition to improve maternal-baby health	Retrospective Study	A sample of 228 pregnant women included those who met the inclusion criteria	The results of this study indicate the need to maintain nutritional needs before or during pregnancy to improve health outcomes for both mother and baby
18	Reyes et al., 2012	Latin America	Comparing the nutritional status of Preeclampsia (PE) women with healthy pregnant and nonpregnant women	Case Control Study	In a study conducted between September 2006 and July 2009, 201 women with PE were compared with 201 pregnant women who fit the inclusion criteria	Showing that higher carbohydrate and sodium intake increases the risk of PE in women in Colombia.
19	Sadegh et al., 2018	Iran	To determine the effect of food supplementation during pregnancy on maternal weight gain, hemoglobin (Hb) levels, and pregnancy outcomes are evaluated	Randomized Control Trial (RCT)	Participants sampled were 1360 pregnant women with 10 weeks' gestation who had a BMI <18.5 and hemoglobin <10.5 / dL	Food supplementation significantly reduces the prevalence of poor maternal weight gain, low birth weight babies, and preterm birth compared with no intervention.
20	Melissa, 2015	Vietnam	This study aims to: (1) examine the role of several measures of pre-pregnant nutritional status on birth	Randomized Control Trial (RCT)	Data are available for the final sample of 1,436 women and couples with single live infants	The findings of this study indicate that maternal nutrition before and during pregnancy has an impact on

			outcomes (2) assess the relative influence of maternal nutritional status before and during pregnancy on birth outcomes			birth outcomes, and therefore the need for treatment aims to provide good birth outcomes.
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5. Arrange, Summarize and Report the Results

Similar to what the previous researchers did [10], in order to compile, summarize and report results, a three-stage approaches used; First, it provides a descriptive numerical analysis that includes the characteristics of the article. Second, identifying strengths and weaknesses found in the literature through thematic analysis of the studies included in the report, the final phase of this phase is to review the findings.

3. Results and Discussion

3.1 Characteristics of Articles

Based on 20 articles that have been selected and in accordance with good quality for scoping review taken from Low Middle Income Countries (LMICs) countries, namely articles from the Asian Continent (India 1 article, Vietnam 2 articles, Indonesia 1 article, China 5 articles, and Iran 1 article), Americas (Mexico 1 article, Brazil 5 articles, Argentina 1 article, and Latin America 1 article), and African Continent (Ethiopia 2 articles) (Figure 2). All articles were selected using quantitative research methods with a Cohort Studies research design of 8 articles, Cross Sectional Studies with 7 articles, Case-control Studies 3 articles and Randomized Controlled Trial Studies (RCT) of 2 articles (Figure 3). In the grade results in this review, the authors make their own assessment to produce the same grade or value for grouping all the results of the range of critical appraisal values, there are 15 grade A articles and 5 grade B articles (Figure 4).

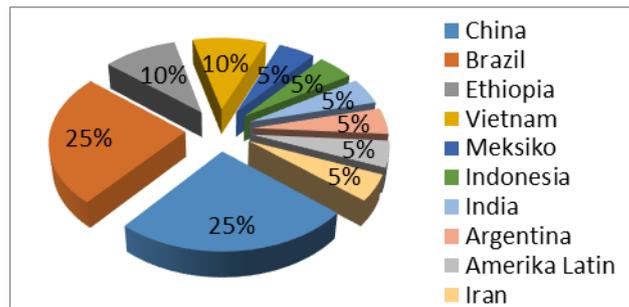


Figure 2. Country Characteristics

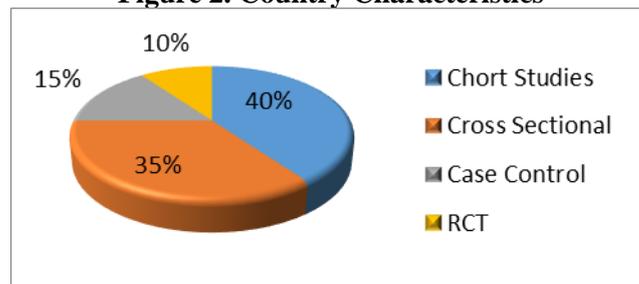


Figure 3. Characteristics of Research Method

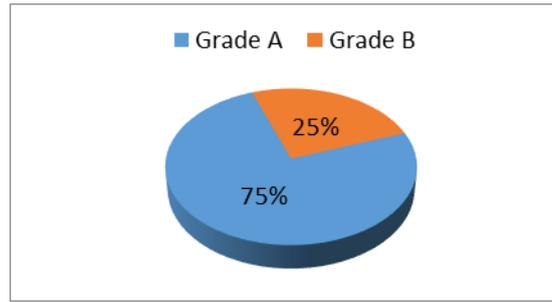


Figure 4. Characteristics of articles by Grade

3.2 Thematic Analysis

Based on a review of 20 articles found two themes that emerged from the results of this review scoping namely where each theme has a sub-theme, in the following table:

Table 5. Thematic Analysis

Articles	Sub Themes	Themes
Articles 1,4,17	Women who experience obesity or high insuline level	Negative outcome of advantage and disadvantage of nutrition in the pregnancy towards mothers
Article 3	Anemia occurance on mothers	
Articles 18	High intake of carbohydrate and natrium increases preeclampsia	
Article 2	Bad nurients result disadvantage pregnancy such as ectopic pregnancy	
Article 5	Postpartum weight retention (PPWR)	
Articles 8,10,13,19,20	Low Birth Weight (LBW)	Negative Outcome of Nutrition Advantage and Disadvantage in the Pregnancy Towards Babies
Articles 6,7,10,16	Macrosomia	
Articles 9,11,12,14	Baby Birth Weight	
Articles 10,16,20	Small Gestational Age (SGA)	
Articles 1,13,16,19	Premature	
Article 16	Neonatal Hypoglycemia	
Article 2	Still Birth (SB)	
Article 15	Neural Tube Defect (NTD)	

3.2.1 Negative impacts of nutritional excess and deficiency in pregnancy on mother

Nutritional status in pregnancy is an assessment of weight gain in pregnancy which has a direct influence on the outcome of obstetrics for both mother and baby [11]. Complications of pregnancy, with unfavorable results for mothers have also been linked to BMI, namely inadequate excessive pregnancy weight gain will give injurious pregnancy effect for maternal health including mothers who are obese, underweight, anemia, preeclampsia, Postpartum Weight Retention (PPWR), and ectopic pregnancy [5].

In this review there are several articles that examine the relationship between excess and nutritional deficiencies in pregnancy for mothers. As for the sub-theme of this discussion, among others, namely:

1. Mothers who are obese or have high insulin levels

There are several articles that examine the relationship of nutritional status or nutrition with the incidence of pregnant women experiencing obesity and high insulin levels. Pregnant women who gained weight showed significant results with an increase in insulin levels during pregnancy ($p = 0.02$) [12]. In line with studies that reveal that being

overweight and obese before pregnancy have a significant increased risk of excessive weight gain in pregnancy (RR: 1.75; 95% CI: 1.48-2.07, RR: 1.55; 95% CI: 1.23-1.96, respectively), excessive weight gain, which occurred in 66.2% of them ($p < 0.001$) [11]. There was a significant relationship ($p < 0.001$) between initial and final nutritional status. The results of several studies stated the importance of maintaining nutritional needs before and during pregnancy aimed at improving the health of mothers and babies [5].

2. Anemia in mothers

Anemia is usually known for lack of blood and can be identified by performing a blood test called Hb. The results of the review article found that the study provided a prevalence ratio for ratio of anemia women due to low and excessive body weight of 0.41 (95% CI 0.18-0.93) and 1.00 (95% CI 0, 63-1.59) and significant results from anemia due to underweight and overweight [13].

3. High intake of carbohydrate and natrium increases preeclampsia

Preeclampsia is a condition that occurs and results from uncontrolled high blood pressure in pregnant women. From the research it was found that higher carbohydrate and sodium intake had an influence on the occurrence of preeclampsia in women during pregnancy. The results showed that carbohydrate and sodium intake had a significant relationship with the development of preeclampsia [14].

4. Poor nutrition results in an ectopic pregnancy

Maternal body mass index is very high and low before pregnancy has a significant relationship an adverse pregnancy and occurred due to nutritional deficiencies, low body weight (AOR 1.09; 95% CI 0.82-1.45) and excessive (aOR 1.78 95% CI 1.13 to 2.81) caused the risk of ectopic pregnancy, and statistical analysis showed a significant difference in the category of women with obesity ($p < 0.0130$) [15].

5. Postpartum Weight Retention (PPWR)

Postpartum weight retention as a source of problems in pregnancy because it is considered to have contributed to overweight. PPWR has a contribution to women's body weight with long-term obesity in mothers, this evidence has been shown from the results of studies that reveal a significant relationship related to PPWR caused by BMI and GWG in pregnancy ($P < 0.001$) [16].

3.2.2 The negative effects of excess and nutritional deficiencies in pregnancy on infants

Nutrition is one of the maternal metabolic factors that influence the process of growth and development of the fetus which can consequently affect the baby. During the pregnancy stage the mother is very required to maintain her body condition to provide a good growth and development process for the baby's condition [17]. Meet good nutrition to increase fetal growth and to meet the increasing demands of the mother's body [18]. In this review there are several articles that examine the relationship between excess and nutritional deficiencies in pregnancy with the birth of a baby. As for the sub-theme of this discussion, among others, namely:

1. Low Birth Weight (LBW)

Women with poor pre-pregnancy BMI have a risk of unhealthy weight results and produce inadequate birth weight for babies. From this study it was found that nearly 15.2% of women's BMI were below the IOM standard and are more likely to have LBW

(OR 2.2, 95% CI 1.1-4.4) [19]. This result is in line with the high anemia prevalence (78.45%) in giving birth to women, while the high prevalence of LBW birth (32.81%) results in giving birth to women as a whole. The results of the research analysis found that there was a correlation between the incidence of anemia with the occurrence of LBW birth (OR, 1.12; 95% CI, 0.65-1.61; $P=0.0003$) [18]. Maternal weight is the source of examinations to predict the outcome of a baby's birth size. Women with PPW <43 kg or who get <8 kg during pregnancy are more likely to give birth to LBW babies (OR 3.1: 95% CI 1.5–6.2, OR 3.4: 95% CI 1.6–7.2) [20]. In this finding, a significant difference was found in LBW as the effect of nutritional deficiencies in the mother ($p = 0.001$) [21]. The occurrence of anemia in the mother has a relationship with birth weight which is verified using an estimated relative risk (RR) and adjusted for the corresponding 95% confidence interval (95% CI). LBW occurs is one of the effects of anemia in the mother with $RR = 1.38$ [95% CI: 1.07 to 1.77] [22].

2. Macrosomia

Macrosomia or commonly known as the weight of a baby born more than 4000 grams. Seeing the incidence of babies born with macrosomia has a high enough risk due to poor maternal BMI. An increase in BMI above the normal pattern shows an association with an increase in neonatal weight. Macrosomia that occurs in newborn babies can be caused because the mother is overweight is 1.82 times (95% CI 1.08-3.06) and giving birth to large babies for gestational age is 2.18 times (95% CI 1.46 -3.24) and in obese mothers, 16.8 times (95% CI 2.22–123.34) [23]. GDM in pregnant women can be caused by GWG and hyperglycemia which exerts an influence on macrosomia. In accordance with the results obtained by researchers in this study that excessive GWG is a risk factor for macrosomia (odds ratio (OR) 2.884, 95% confidence interval (CI) 1.385-6.004, $p<0.01$) [24]. In line with research that states there is a relationship between macrosomia births caused by maternal BMI. The proportion of women who are overweight and obese is 12.3%. Mothers who are overweight and obese can provide high macrosomia birth outcomes (OR 1.7, 95% CI 1.2-2.6) [19]. Likewise with the results of this study which stated a significant association of macrosomia caused by excessive GWG ($P <0.001$) [25].

3. Baby birth weight

The results of this review have shown that anthropometric measurements and maternal hemoglobin levels are related to infant birth weight outcomes that are influenced by nutritional status during pregnancy . Therefore, it is important to improve maternal nutrition to avoid the occurrence of LBW and macrosomia. Pre-pregnancy BMI ($p <0.001$) and weight gain during pregnancy ($p <0.001$) are positively related to infant birth weight. Pre-pregnancy BMI ($p <0.001$) and weight gain during pregnancy ($p <0.001$) are positively related to infant birth weight [17]. The results of the review study above are in line with the results of this study because of the correlation between maternal weight gain and infant birth weight with $p = 0.03$ ($p <0.05$, 95% CI) [26]. The findings of this article state that mothers who are obese before pregnancy have a correlation with the amount of neonatal fat mass and have a relationship with the body mass index of the mother [27]. Prenatal iron supplements plus folic acid increase the average birth weight 45.3 g (9.4 to 81.1 g, $p = 0.014$) and 30.9 g (15.6 to 46.1 g, $p <0.001$) [28].

4. Small Gestational Age (SGA)

In this review there are several articles related to the results of the SGA for gestational age for maternal nutrition during pregnancy. The results of this review have shown that the relationship between women having GWG under the IOM guidelines is more likely to have SGA (OR 2.0, 95% CI 1.2-3.4). Pregnant women who have a bad weight gain have an effect will have a negative impact on birth outcomes[19]. This is in line with the results

of the study which stated excessive GWG was independently associated with SGA (aOR 0.49, 95% CI 0.25-0.97, P=0.040) [25]. Need attention to excessive increase and weight loss of pregnant women with GDM. In the results of this study stated that there is a significant relationship between the occurrences of SGA with maternal nutritional needs during pregnancy. Maternal weight is the strongest indicator that predicts the birth outcomes. Women with PPW <43 kg or who get <8 kg during pregnancy are more likely to give birth to SGA (OR 2.9: 95% CI 1.9-4.5, OR 3.3: 95% CI 2.2-5.1) [20].

5. Premature

It was found that a significant relationship between the average gestational age at birth was 38.20 ± 2.05 weeks of gestation; 18.07% (n = 32) preterm birth. The mean birth weight was 2959.33 ± 460.41 g. Higher mean birth weight was observed in women who had excessive pregnancy weight gain (3156.75 ± 403.96 g) compared to those who had adequate pregnancy weight gain (2861.05 ± 478.79 g) and insufficient weight gain (2904.93 ± 422.36 g) (p = 0.001) [12]. In line with the results obtained in the study investigated by the research articles that inadequate GWG increased the incidence of premature birth (aOR 3.53, 95% CI 1.96 - 6.37, P < 0.001) [25]. Good food intake can reduce the risk of premature birth outcomes compared without intervention. Between comparison groups revealed significant differences in preterm birth (p = 0.013) [21]. The above study is in line with the results obtained in this study that the high prevalence of anemia (78.45%) in giving birth to women, while the high prevalence of preterm birth (34.75%) in giving birth to women as a whole. In the adjusted analysis, overall anemia in pregnancy was strongly associated with preterm birth (OR, 3.42; 95% CI, 1.98-5.88; P ≤ 0.001) [18].

6. Neonatal hypoglycemia

Hypoglycemia is a condition when glucose (blood sugar) levels are below normal. Excessive and insufficient weight gain requires special attention for women with GDM. But nutrition and exercise can be used as maternal intervention to control blood glucose in the body so that it can control body weight gain that is reasonable or in accordance with IOM standards that are useful to avoid adverse pregnancy and birth outcomes. The results of this study stated that there was a significant correlation between excessive GWG independently associated with neonatal hypoglycemia birth outcomes (aOR 3.80, 95% CI 1.20-12.00, P = 0.023) [25].

7. Still Birth (SB)

In this review there are 1 article related to birth outcomes Still Birth (SB) due to maternal nutrition in pregnancy. Still Birth (SB) is an event or condition that occurs before complete espulsion or extraction, ie the baby dies, this is the result of fertilization from the mother at or after 20 weeks' gestation. The results showed that maternal body mass index (BMI) that was very high and low before pregnancy had a significant relationship with adverse pregnancy and occurred due to nutritional deficiencies. Mothers who experience malnutrition and excess have a significant difference and obesity has an influence on the occurrence of stillbirths (aOR 1.59; 95% CI 1.18-2.15) [15].

8. Neural Tube Defect (NTD)

NTD occur when the fetal nerve tube fails to close properly, thereby disrupting the development of the central nervous system. NTD defects form early in pregnancy, about 28 days after conception. The exact cause of NTD is not yet fully known, but experts believe NTD can occur due to several factors, such as genetic, environmental and health. Maternal nutritional status can be a determinant of the possibility of giving birth to a baby

affected by NTD. This study states that the assessment of food diversity scores shows that low and high food diversity scores are statistically significant differences ($p = 0.0003$) and ($p = 0.0002$) compared to controls, but moderate food diversity scores were not found significant variation ($p = 0.35$) [29].

4. Conclusion

From 20 articles scoping review that has been carried out with the topic "Outcomes Obstetric Nutrition Status in Pregnancy". The results of the scoping review show that most articles on birth outcomes are caused due to deficiency and excess nutrition in the mother in pregnancy which is the biggest outcome, LBW, macrosomia, baby birth weight and premature. In addition, negative outcomes of excess and nutritional deficiencies in pregnancy also occur to mothers, that most mothers are obese or have high insulin levels. Improving the status of good nutrition for pregnant women aims to avoid complications during pregnancy and birth that can cause high mortality and morbidity rates for mothers and babies. Researchers have also found a research gap that can be used as a reference in future research, namely in the article I get that the need for further research to determine the increased risk of complications of early dystrophy and amniotic rupture caused by poor maternal nutritional status in pregnancy.

Many attempts have been made to reduce the limitations of this study, using the framework of Arksey and O'Malley, searching reference lists and discussing with other researchers. The process of searching for articles is already extensive, but there may still be articles that are missed. From this review there are two themes, namely the negative outcome of excess and nutritional deficiencies in pregnancy for mothers and for infants.

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