Niluh Suwasanti

17-LITERATURE REVIEW: ASSOCIATION BETWEEN MATERNAL SERUM ALBUMIN LEVELS AND LOW BIRTH WEIGHT (LBW)

Cek Niluh Suwasanti

Document Details

Submission ID
trn:oid:::3618:127376813

Submission Date
Feb 2, 2026, 5:57 PM GMT+7

Download Date
Feb 3, 2026, 11:28 AM GMT+7

File Name
17-Literature_review_association_between_.pdf

File Size
183.9 KB

6 Pages

2,648 Words

13,821 Characters

3% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Filtered from the Report

- Bibliography

Exclusions

- 5 Excluded Sources
- 53 Excluded Matches

Match Groups

5 Not Cited or Quoted 3%
Matches with neither in-text citation nor quotation marks

3 Missing Quotations 1%
Matches that are still very similar to source material

0 Missing Citation 0%
Matches that have quotation marks, but no in-text citation

0 Cited and Quoted 0%
Matches with in-text citation present, but no quotation marks

Top Sources

2% Internet sources
2% Publications
3% Submitted works (Student Papers)

Integrity Flags

0 Integrity Flags for Review

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

Match Groups

- **5** Not Cited or Quoted 3%
  Matches with neither in-text citation nor quotation marks
- **3** Missing Quotations 1%
  Matches that are still very similar to source material
- **0** Missing Citation 0%
  Matches that have quotation marks, but no in-text citation
- **0** Cited and Quoted 0%
  Matches with in-text citation present, but no quotation marks

Top Sources

2% Internet sources
2% Publications
3% Submitted works (Student Papers)

Top Sources

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	Student papers	
National postgraduate Medical College of Nigeria on 2019-04-13		<1%
2	Student papers	
Wageningen University on 2024-04-20		<1%
3	Student papers	
National postgraduate Medical College of Nigeria on 2018-08-29		<1%
4	Internet	
ir.kabarak.ac.ke		<1%
5	Internet	
link.springer.com		<1%
6	Publication	
Pawan Kumar Kare, Ayushmaan Varyani, Tripti Saxena, Anshita Rathore, Rekha W...		<1%
7	Student papers	
Universitas Katolik Widya Mandala Surabaya on 2025-11-08		<1%
8	Internet	
www.saudijournals.com		<1%

LITERATURE REVIEW: ASSOCIATION BETWEEN MATERNAL SERUM ALBUMIN LEVELS AND LOW BIRTH WEIGHT (LBW)

Stefanny Andrea Williana[1)], Sianty Dewi[2)], Niluh Suwasanti[3)]

DOI: https://doi.org/10.33508/jwmj.v5i2.3679

ABSTRACT

Introduction: There are physiological changes during pregnancy, one of which is an increase in mother's nutritional needs, which is protein. The most abundant plasma protein component is albumin; hypoalbuminemia is serum albumin levels below the normal values, which it can occur due to malnutrition, inflammation, kidney or liver damage where albumin is synthesized. Good nutritional status in pregnant women can prevent Low Birth Weight (LBW), while hypoalbuminemia in pregnant women can increase the risk of LBW. LBW is neonatal birth weight <2500 grams that can cause neonatal death and increase the risk of other diseases. LBW is a global problem, and in Indonesia LBW was also the most common cause of neonatal death in 2019 with a percentage of 35.3%. In Surabaya, there were 703 LBW cases (1.6%) in 2019; moreover, there were 15 LBW cases (1.92%) at Jagir Health Center in 2020.

Purpose: The aim of this study was to determine the association between maternal serum albumin levels and LBW.

Method: The method used in this thesis is literature review with 10 research journals. The literatures that used in this literature review are journals with topics that related to the association between maternal serum albumin levels and neonatal birth weight.

Result: From this literature review, there are 5 research journals conclude that there is a significant association between maternal serum albumin levels and neonatal birth weight.

Conclusion: In conclusion, there is a possible association between maternal serum albumin levels and neonatal birth weight.

Keywords: *maternal serum albumin, hypoalbuminemia, birth weight, LBW*

[1)]*Student of Faculty of Medicine, Widya Mandala Surabaya Catholic University. Email : stefannyandrea99@gmail.com*

[2)]*Department of Obstetrics and Gynecology, Faculty of Medicine, Widya Mandala Surabaya Catholic University. Email : sianty@ukwms.ac.id*

[3)]*Department of Clinical Pathology, Faculty of Medicine, Widya Mandala Surabaya Catholic University. Email : niluh@ukwms.ac.id*

INTRODUCTION

Albumin is the most abundant plasma protein, which is 50-60% from the total protein in the blood [1]. Albumin plays roles in plasma oncotic pressure, as an antioxidant, and helps distribute various substances and drugs in the body [2]. Good nutritional status in pregnant women can prevent Low Birth Weight (LBW), while pregnant women with low serum albumin levels are prone to LBW of their babies [3,4].

According to World Health Organization (WHO), LBW is a baby born with weight <2500 grams [5]. LBW is a global problem as there are 15.5% LBW cases in the world, moreover LBW can cause neonatal death and increase the risk of diseases [6,7]. In 2019, there were 3.4% LBW cases in Indonesia [4]. According to East Java Health Office, in 2019 there were 3.9% LBW cases in East Java and 1.6% cases in Surabaya (703 cases) [8]. LBW can be caused by infections, smoking habits, premature birth, multiple pregnancies, preeclampsia, eclampsia, and malnutrition [6].

Research by Trivedi in 2016 in India concluded that there was a significant association between low serum albumin level and LBW, while research by Gómez-Cantarino in 2020 in Spain concluded that there was no significant association between maternal serum albumin levels in the first, second, and third trimesters and birth weight [1,9]. Therefore, the aim of this study was to determine the association between maternal serum albumin levels and LBW.

METHOD

This research used literature review method, which was to analyze the online literatures with topics that related to the association between maternal serum albumin levels and neonatal birth weight. The keywords were maternal serum albumin, hypoalbuminemia, birth weight, dan low birth weight. The literatures were obtained from Pubmed, Google Scholar, Sciencedirect, Researchgate, and Mendeley. The inclusion criteria were Indonesian and English literatures with related topics, from primary data source, published in the last 10 years (2011-2021), and online. There were 10 literatures that met the inclusion criteria.

RESULTS

According to 10 literatures that have been analyzed, there were some similarities and differences. Researches by Ahmadu (2012), Sultana (2012), Amosu (2014), and Chaudhry (2017) used cross-sectional research method [10–13]. There were 2 literatures, research by Sakar (2015) and Agbonlahor (2016), that used prospective case-control research method, whereas there were literatures that used prospective cohort research method, which were researches by Hsu (2013), Trivedi (2017), Gómez-Cantarino (2020), and Wada (2021) [1,9,14–17]. Sultana (2012), Hsu (2013), Trivedi (2016), Chaudhry (2017), and Gómez-Cantarino (2020) researches used correlation test for their data analysis technique to find out the association between maternal serum albumin levels and neonatal birth weight [1,9,11,13,14].

Intervention of the study subjects that has been done by 5 literatures, such as Hsu (2013), Gómez-Cantarino (2020), and Wada (2021) researches, was 3 times blood draw in the first, second, and third trimesters, or during ANC [1,14,15]. Intervention of the study subjects that has been done by the other 5 literatures, such as Ahmadu (2012) and Sakar (2015) researches, was a blood draw in the third trimester or during labor. Moreover, several literatures conducted research on maternal nutritional intake during pregnancy which can support their study results; they were Hsu (2013), Sakar (2015), and Chaudhry (2017) researches [13,14,16].

The results from 10 research literatures also have similarity and difference. There were 5 literatures stated that there was a significant association between maternal serum albumin levels and neonatal birth

Online-ISSN 2565-1409 Journal of Widya Medika Junior Vol 5. No. 2 April 2023

weight, which were researches by Sultana (2012), Hsu (2013), Amosu (2014), Trivedi (2016), and Chaudhry (2017) [9,11–14]. The other 5 literatures stated that there was no significant association

Table 1. Literature Review Matrix

No.	Authors' Name	Article Title	Journal Name, Volume, No., Page.	Publication Year
1.	Ahmadu B, Ayodele A, Ngadda H, et al.	Correlation of maternal albumin and birth weight of babies in a Nigerian Teaching Hospital	International Journal of Public Health and Epidemiology, 1 (1), Page 10-13	2012
2.	Sultana M, Jahan N, Sultana N, et al.	Serum copper and plasma protein status in preterm delivery	Journal of Bangladesh Society of Physiologist, 7 (1), Page 41-47	2012
3.	Hsu WY, Wu CH, Hsieh CTC, et al.	Low body weight gain, low white blood cell count and high serum ferritin as markers of poor nutrition and increased risk for preterm delivery	Asia Pacific Journal of Clinical Nutrition, 22 (1), Page 90-99	2013
4.	Amosu A, Degun A.	Impact of maternal nutrition on birth weight of babies	Biomedical Research, 25 (1), Page 75-78	2014
5.	Sakar MN, Balsak D, Verit FF, et al.	The effect of Ramadan fasting and maternal hypoalbuminemia on neonatal anthropometric parameters and placental weight	Journal of Obstetrics and Gynaecology, 36 (4), Page 483-486	2015
6.	Agbonlahor O, Emokpae M.	Levels of some essential elements in pregnant women and association with low birth weight of babies in Benin City	Pakistan Journal of Nutrition, 15 (6), Page 585-589	2016
7.	Trivedi D, Shindhe V, Rokhade C.	Influence of maternal nutrition status during pregnancy on developmental outcome in first 30 days of independent neonatal life	International Journal of Clinical Biochemistry and Research, 3 (4), Page 371-375	2016
8.	Chaudhry E, Chaudhry Z, Chaudhry S.	Correlation of maternal albumin levels with neonatal birth weight	Journal of Islamic International Medical College, 12 (2), Page 97-100	2017
9.	Gómez-Cantarino S, Agulló-	Prevalence of hypoproteinemia and hypoalbuminemia in	International Journal of Environmental Research and Public Health, 17 (17), Page	2020

	Ortuño MT, de Dios-Aguado M, et al.	pregnant women from three different socioeconomic populations	1-10	
10.	Wada Y, Ehara T, Tabata F, et al.	Maternal serum albumin redox state is associated with infant birth weight in Japanese pregnant women	Nutrients, 13 (6), Page 1-12	2021

DISCUSSION

In results of a study of 10 literatures, it was found that there was an association between maternal serum albumin levels and neonatal birth weight. There is a change of albumin levels in pregnant women due to increased blood volume, hormonal, and increased nutritional requirements [18,19]. Increased nutritional requirements of pregnant women to fulfill the nutritional needs of the fetus. One of the nutritional requirements that increases during pregnancy is protein, and the protein requirement of pregnant women is 60 grams per day [18].

Protein intake is needed for the plasma protein formation, one of which is albumin. Normal serum albumin level is 3.5-5 g/dL, whereas hypoalbuminemia is serum albumin level <3.5 g/dL [20]. Hypoalbuminemia can be caused by impaired albumin clearance, impaired albumin distribution, and decreased albumin synthesis in the liver, for instance due to malnutrition. Therefore, serum albumin, which is a protein, will decrease if protein intake is less [3,21].

Lack of protein intake during pregnancy also causes lack of protein intake for the fetus, so fetal growth and development can be hampered. It can affect the neonatal birth weight, which is LBW [3,22]. That statement is supported by Sultana research in Bangladesh (2012), Hsu research in Taiwan (2013), Amosu research in Nigeria (2014), and Trivedi research in India (2016) [9,11,12,14].

Factors which can increase the risk of LBW are too young maternal age, gemelli, low education level, anemia, preeclampsia, eclampsia, lack of ANC visits and quality of ANC, and lack of maternal nutrition [6,22–25]. Adequate protein intake in pregnant women, which can be assessed from serum albumin levels, shows that albumin synthesis is going well so that it can reach the normal value of 3.5-5 g/dL, and it can reduce the risk of LBW [3,26]. That statement is supported by Chaudhry research in Pakistan (2017) [13].

In Hsu's study (2013) which conducted blood sampling in each trimester, it was found that serum albumin levels in the second and third trimesters had a positive and significant association with neonatal birth weight. Moreover, the study also conducted data collection on maternal daily intake using a questionnaire, and it was found that maternal protein intake was higher in the second and third trimesters. Hence, serum albumin levels that can be affected by maternal protein intake can affect neonatal birth weight [14].

CONCLUSION

There are 5 literatures conclude that there is a significant association, while the other 5 literatures conclude that there is no significant association between maternal serum albumin levels and neonatal birth weight. Hence, there is a possible association between maternal serum albumin levels and neonatal birth weight.

REFERENCES

1. Gómez-Cantarino S, Agulló-Ortuño MT, de Dios-Aguado M, Ugarte-Gurrutxaga MI, Bouzas-Mosquera C. Prevalence of hypoproteinemia and hypoalbuminemia in pregnant women from three different socioeconomic populations. Int J Environ Res Public Health. 2020;17(17):1–10.
2. Di Masi A, Trezza V, Leboffe L, Ascenzi P. Human plasma lipocalins and serum albumin: plasma alternative carriers? J Control Release [Internet]. 2016;228:191–205. Available from: http://dx.doi.org/10.1016/j.jconrel.2016.02.049
3. Anggraini S, Angraini DI, Mayasari D, Sari RDP. Pengaruh kurang energi kronik terhadap kadar albumin serum ibu hamil di Kota Bandar Lampung. Med J Lampung Univ. 2019;8:115–9.
4. Kemenkes RI. Profil kesehatan Indonesia tahun 2019. Kementerian Kesehatan Republik Indonesia. Kementerian Kesehatan RI; 2020.
5. Sema A, Tesfaye F, Belay Y, Amsalu B, Bekele D, Desalew A. Associated factors with low birth weight in Dire Dawa City, Eastern Ethiopia: A cross-sectional study. Biomed Res Int. 2019;2019:1–8.
6. Kandel KP, Kafle S. Risk factors associated with low birth weight among deliveries at Bharatpur Hospital. J Nepal Health Res Counc. 2017;15(2):169–73.
7. Anil KC, Basel PL, Singh S. Low birth weight and its associated risk factors: Health facility-based case-control study. PLoS One [Internet]. 2020;15(6 June):1–10. Available from: http://dx.doi.org/10.1371/journal.pone.0234907
8. Dinas Kesehatan Provinsi Jawa Timur. Profil kesehatan Provinsi Jawa Timur 2019. Profil Kesehatan Provinsi Jawa Timur. Dinas Kesehatan Provinsi Jawa Timur; 2020.
9. Trivedi DJ, Shindhe V, Rokhade CJ. Influence of maternal nutrition status during pregnancy on developmental outcome in first 30 days of independent neonatal life. Int J Clin Biochem Res. 2016;3(4):371–5.
10. Ahmadu BU, Ayodele AA, Ngadda H, Jungudu U. Correlation of maternal albumin and birth weight of babies in a Nigerian Teaching Hospital. Int J Public Heal Epidemiol. 2012;1(1):10–3.
11. Sultana M, Jahan N, Sultana N, Akter R. Serum copper and plasma protein status in normal pregnancy. J Bangladesh Soc Physiol. 2012;7(1):41–7.
12. Amosu AM, Degun AM. Impact of maternal nutrition on birth weight of babies. Biomed Res. 2014;25(1):75–8.
13. Chaudhry ER, Chaudhry ZR, Chaudhry SR. Correlation of maternal albumin levels with neonatal birth weight. J Islam Int Med Coll. 2017;12(2):97–100.
14. Hsu WY, Wu CH, Hsieh CTC, Lo HC, Lin JS, Kao MD. Low body weight gain, low white blood cell count and high serum ferritin as markers of poor nutrition and increased risk for preterm delivery. Asia Pac J Clin Nutr. 2013;22(1):90–9.
15. Wada Y, Ehara T, Tabata F, Komatsu Y, Izumi H, Kawakami S, et al. Maternal serum albumin redox state is associated with infant birth weight in Japanese pregnant women. Nutrients. 2021;13(6):1–12.
16. Sakar MN, Balsak D, Verit FF, Zebitay AG, Buyuk A, Akay E, et al. The effect of Ramadan fasting and maternal hypoalbuminaemia on neonatal anthropometric parameters and placental weight. J Obstet Gynaecol (Lahore). 2015;36(4):483–

6.
17. Agbonlahor OJ, Emokpae MA. Levels of some essential elements in pregnant women and association with low birth weight of babies in Benin City. Pakistan J Nutr. 2016;15(6):585–9.
18. Prawirohardjo S. Ilmu kebidanan Sarwono Prawirohardjo. Ed Ke-4 Jakarta Yayasan Bina Pustaka Sarwono Prawirohardjo. 2016;
19. Agbecha A, Agbecha A, Yisa EN. Serum albumin level in second and third trimester pregnancies in Makurdi, Nigeria. Saudi J Biomed Res [Internet]. 2018;3(6):175–80. Available from: http://scholarsmepub.com/sjbr/
20. Akirov A, Masri-Iraqi H, Atamna A, Shimon I. Low albumin levels are associated with mortality risk in hospitalized patients. Am J Med [Internet]. 2017;130(12):1465.e11-1465.e19. Available from: https://doi.org/10.1016/j.amjmed.2017.07.020
21. Nzioka Mutua D, Mwaniki Njagi EN, Orinda G. Liver function tests in normal pregnant women. J Liver. 2018;07(02):2–5.
22. Kumalasari I, Tjekyan RS, Zulkarnain M. Faktor resiko dan angka kejadian Berat Badan Lahir Rendah (BBLR) di RSUP Dr. Mohammad Hoesin Palembang tahun 2014. J Ilmu Kesehat Masy. 2018;9(1365):41–52.
23. Hartiningrum I, Fitriyah N. Bayi Berat Lahir Rendah (BBLR) di Provinsi Jawa Timur Tahun 2012-2016. J Biometrika dan Kependud. 2019;7(2):97.
24. Mousa A, Naqash A, Lim S. Macronutrient and micronutrient intake during pregnancy: An overview of recent evidence. Nutrients. 2019;11(2):1–20.
25. Fatimah N, Utama BI, Sastri S. Hubungan antenatal care dengan kejadian bayi berat lahir rendah pada ibu aterm di RSUP Dr. M. Djamil Padang. J Kesehat Andalas. 2017;6(3):615–20.
26. Arques S. Human serum albumin in cardiovascular diseases. Eur J Intern Med [Internet]. 2018;52(March):8–12. Available from: http://dx.doi.org/10.1016/j.ejim.2018.04.014