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Factors Associated with Hyperemesis Gravidarum at the University of Eastern Indonesia Tourism General Hospital

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ABSTRACT

Hyperemesis gravidarum (HG) is a condition of excessive nausea and vomiting often experienced during pregnancy. Although common, the impact of HG on the pregnant mother and fetus can be significant. Therefore, this study aims to explore the factors associated with the incidence of HG at the University of Eastern Indonesia Tourism General Hospital. This study aims to Identify factors associated with the incidence of Hyperemesis Gravidarum. Analyze the severity of HG and its impact on the health of pregnant women. Assess the effectiveness of various methods of management and intervention against HG. The research method used was observational research with a case-control study approach. Data were collected through interviews with pregnant women who experienced HG and pregnant women without complaints of excessive nausea. In addition, medical data and medical records were also analyzed to obtain further information. Based on data analysis, it was found that several factors such as family history, maternal age, and nutritional status could be associated with the incidence of Hyperemesis Gravidarum. The severity of HG is also associated with pregnancy complications and fetal growth. Interventions such as nutritional management and psychological support were found to be effective in reducing the severity of HG. Based on the findings of this study, it can be concluded that certain factors have a correlation with the incidence of Hyperemesis Gravidarum. By understanding these factors, better prevention and intervention efforts can be developed to improve maternal and fetal health.

Keywords: *Hyperemesis Gravidarum, Risk Factors for Hyperemesis Gravidarum, Maternal Health*

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INTRODUCTION

Nausea and vomiting are common symptoms and are often found in the first trimester of pregnancy.Nausea usually occurs in the morning, but can also arise at any time at night (Ozgunay dkk., 2022).These symptoms occur approximately 6 weeks after the first day of the last menstrual period and last for approximately 10 weeks (Parikh dkk., 2021).This feeling of nausea is caused by increasing levels of estrogen and HCG (Human Crorionic Gonadrotropin) in the serum.

Mortality and morbidity in pregnant and maternal women is a major problem in developing countries (Wright dkk., 2020). In poor countries, about 25-50% of deaths of women of childbearing age are caused by things related to pregnancy (Sacchi dkk., 2020a). Maternal mortality is a complex problem, encompassing non-technical issues such as a woman's status and education (Mitchell-Jones dkk., 2020). Although the problem needs to be addressed early on, it is unrealistic to expect changes in a short period of time (Magnus dkk., 2019). Therefore, interventions that have a real impact in a relatively short time are needed.

According to Nugraha, the World Health Organization (WHO), the number of hyperemesis gravidarum incidents reaches 12.5ri of the total number of pregnancies in the world (Sacchi dkk., 2020b). Women in Indonesia who experience pregnancy are 5,212,568 pregnant women, of the number of pregnant women who experience Gravidarum reaches 14.8%, according to WHO as a UN agency that handles health sector issues (Amri dkk., 2023), says that hyperemesis gravidarum occurs throughout the world, including countries in the Americas with varying incidence rates (Aiken dkk., 2021). Meanwhile, the incidence of Hyperemesis Gravidarum also occurs in Asia, for example Pakistan (Bimpong dkk., 2020), Turkey and Malaysia (Austin dkk., 2019). Meanwhile, the incidence of hyperemesis gravidarum in Indonesia is ranging from 1% to 3ri of all pregnancies.

The death of a mother in childbirth or by other pregnancy-related causes is a devastating experience for the family and the child left behind (Machitidze, 2023). One of the government's goals to realize the health development plan is to put efforts to reduce maternal mortality rates.

One of the complications of pregnancy that affects the health status of the mother and fetal growth and development is hyperemesis gravidarum, which can be detected and prevented during pregnancy.

Nausea and vomiting is a disorder that is often found in the first trimester, about 60-80% in primigravida and 40-60% in multigravida experience it, this symptom is aggravated in only 1 in 1000 pregnancies.

Information obtained from Wisata General Hospital in 2023 recorded 133 pregnant women who checked their pregnancy 57 people were treated for hyperemesis gravidarum cases (Szmuilowicz dkk., 2019). Considering that hyperemesis gravidarum cases can cause more severe complications and affect the health status of mothers and children, the authors are interested in learning about hyperemesis gravidarum with an

adequate midwifery care approach in an effort to improve the health of mothers and children.

The discussion of the incidence rate of hyperemesis gravidarum in this proposition is motivated because the incidence rate of hyperemesis gravidarum is often unknown and unnoticed by pregnant women because it is considered a natural thing in young pregnancy and without realizing these complications can aggravate the mother's condition, causing pain to the mother (Ye dkk., 2022). The handling of hyperemesis gravidarum depends on the level where the patient must be hospitalized so that complications do not become severe (Connor dkk., 2020). With the application of adequate midwifery care (Wright dkk., 2020), it is hoped that it can detect early conditions that are classified as complications of pregnancy for both the mother and the fetus so that it is hoped that each pregnancy will take place normally and in the end a healthy baby will be born and does not interfere with the health of the mother (Yu dkk., 2022). Based on information from trusted sources (Collins dkk., 2022), the author is interested in raising the title "Factors associated with the incidence of hyperemesis gravidarum at the General Hospital of the East Indonesia University Tour.

RESEARCH METHODOLOGY

Nausea and vomiting occur in 60%-80% of primigravidas and 40%-60% of multigravidas (Agmon dkk., 2019). In one in a thousand pregnancies (Zimmerman dkk., 2022), these symptoms become more severe. This feeling of nausea is caused by the increase in serum levels of estrogen and HCG hormones (Nijsten dkk., 2022). The physiological effect of this hormone increase is not yet clear, perhaps because the central nervous system or gastric emptying is reduced in general women can adjust to this situation, however, symptoms of severe nausea and vomiting can last up to 4 months (Lindström dkk., 2023).There are several factors associated with the incidence of Hyperemesis Gravidarum such as maternal age, parity, gestational age, molahidatidosa, multiple pregnancies, allergies and psychological factors.

In this study, a study will be conducted on Hyperemesis Gravidarum in terms of parity, maternal age, and occupation. The variables are briefly described as follows:

1. **Mother's Age**

According to Usman AR in the dictionary of medical terms (2012) age is the length of time humans live which is calculated from birth (Agmon dkk., 2019). The age of the mother at the time of pregnancy is one of the factors causing Hyperemesis Gravidarum, the age of a woman who is too young to become pregnant causes not ready / afraid of the responsibilities of motherhood causing mental conflicts that can aggravate nausea and vomiting as an unconscious expression of reluctance to become pregnant or as an escape from life's difficulties (MacGibbon dkk., 2021). Conversely, a woman in her older age will result in a process of decline in the physiological functions of the body including reproductive organs so that the mother feels afraid of pregnancy and childbirth faced (Davis & Nippita, 2020). Thus the age of a mother is a determinant of whether or not Hyperemesis Gravidarum occurs.

2. Parity

Parity is the number of pregnancies and childbirth passed by the mother with viable gestational age (Cuff, 2019). The frequency / number of pregnancies often experienced by the mother is a condition that affects physically and psychologically and as a result there can be complications in pregnancy such as Hyperemesis Gravidarum.

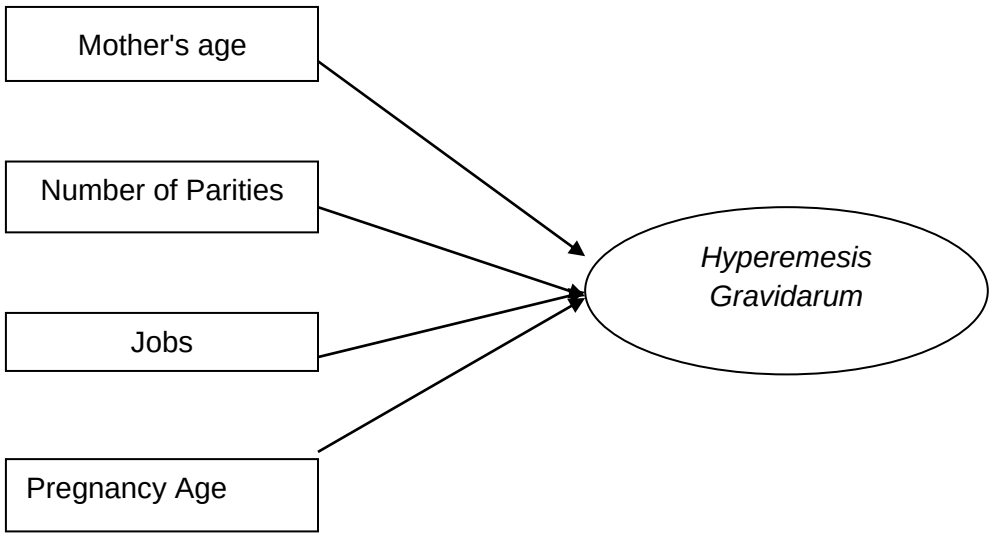
3. Work

Work that causes mental conflict can exacerbate nausea and vomiting (Sridharan & Sivaramakrishnan, 2018). Work that requires concentration and responsibility can cause psychological disorders for the mother (Kc dkk., 2023), although until now it is not known exactly how much psychology affects the occurrence of Hyperemesis Gravidarum (Alqahtani dkk., 2020), not infrequently by providing a new atmosphere, can already help reduce the frequency of vomiting.

4. Gestational Age

The length of pregnancy starting from the ovulation process until the baby is born is approximately 280 days or 40 weeks .In general, in pregnancy, excessive nausea and vomiting are often found, usually appearing at 4-6 weeks of pregnancy and reaching its peak in weeks 9-13 weeks of pregnancy.Nausea and vomiting will usually subside after passing the first trimester of pregnancy (Beta dkk., 2019). However, excessive vomiting caused by pregnancy complications, namely Hyperemesis Gravidarum, can continue until week 20, even throughout pregnancy.

Based on the concept of thinking above, a mindset chart of the variables studied is compiled as follows:



Description : : Dependent variable

: Independent variable

The type of research used is Analytical Survey with a "cross Sectional study" approach where data relating to the dependent variable and the independent variable are collected simultaneously to obtain information about factors associated with the incidence of Hyperemesis Gravidarum.

The study was conducted at the General Hospital of the University of Eastern Indonesia in September 2023 with the consideration that the hospital is a hospital that has the completeness of the status needed in data collection, besides that the hospital is also an inpatient hospital and serves obstetric problems that reach all levels of society.

RESULT AND DISCUSSION

This analysis aims to describe the characteristics of respondents based on age, parity, occupation and gestational age, to determine whether there is a relationship with the incidence of hyperemesis gravidarum, based on this stage (Blais dkk., 2019), frequency distribution analysis of presentation variables of age, parity, occupation and gestational age is carried out.

a. Hyperemesis gravidarum.

Table 1. Distribution of Respondents Who Experienced Hyperemesis Gravidarumat RSU Wisata University of Eastern Indonesia

Hyperemesis gravidarum	**Total (n)**	**Persen (%)**
Yes	57	42,8
No	76	57,2
Total	133	100

Source: Primary data

Table 1 provides information that 31 respondents (54.4%) experienced hyperemesis gravidarum and 26 respondents (45.6%) who did not experience hyperemesis gravidarum.

b. Age

Table 2.
Distribution of Respondents by Age
at RSU Wisata University of Eastern Indonesia

Age	**Total (n)**	**Persen (%)**
High	38	66,7
Low	19	33,3
Total	57	100

Source: Primary data

Table 2 provides information that 38 respondents (66.7%) had a high-risk age and 19 respondents (33.3%) had a low-risk age. (33,3%).

c. Paritas

Tabel 3.

Distribusi Responden Menurut Paritas

di RSU Wisata Universitas Indonesia Timur

Parity	Total (n)	Persen (%)
High	36	63,2
Low	21	36,8
Total	57	100

Source: Primary data

Table 3 shows that respondents who have high parity are 36 (63.2%) and those who have low parity are 21 (36.8%).

d. Occupation

Table 4.

Distribution of Respondents by Occupation

at RSU Wisata University of Eastern Indonesia

Work	Total (n)	Persen (%)
High	19	33,3
Low	38	66,7
Total	57	100

Source: Primary data

Table 4, shows that there are 19 respondents (33.3%) who have high risk jobs and there are 38 respondents (66.7%) who have low risk jobs. .

e. Gestational age

Table 5.

Distribution of Respondents by Age of Pregnancy

at Universitas Indonesia Timur Tourist Hospital

Gestational age	Total (n)	Persen (%)
High	33	57,9
Low	24	42,1

Total	57	100

Source: Primary data

Table 5, shows that there are 33 respondents (57.9%) who have a high risk gestational age and there are 24 respondents (42.1%) who have a low risk gestational age.

1. **Age**

Based on the results of statistical tests obtained a value of p = 0.001 which means there is a relationship between the age of the mother with the incidence of Hyperemesis gravidarum.

According to Ridwan A and Wahidudin (2007), a healthy and safe reproductive age is 20-35 years old (Gurol-Urganci dkk., 2021). Pregnancy at the age of less than 20 years and above 35 years can cause hyperemesis gravidarum because in pregnancy at the age of less than 20 years biologically not optimal emotions, tend to be unstable, mentally immature so easy to experience shocks that result in inattention to the fulfillment of nutritional needs during pregnancy, while at the age of 35 years related to the deterioration and decrease in endurance and various diseases that often befall in this world, this is in line with research by Iyam Manuake who said there was a relationship between age and the incidence of hyperemesis gravidarum.

2. **Parity**

Based on the results of statistical tests obtained a value of p = 0.005 means there is a relationship between parity with the incidence of hyperemesis gravidarum. Where parity 2-3 is the safest parity in terms of maternal mortality, parity 1 and high parity more than 3 have a higher maternal mortality rate (Thapa dkk., 2020). This is due to the psychological factors of pregnant women who are not ready for their pregnancy, still adjusting to becoming parents with greater responsibilities so that it can trigger the occurrence of hyperemesis gravidarum while for parity more than 3 the decline in organ function which causes reduced endurance can lead to various risk factors during pregnancy (“Medical Tourism Awareness of Health Workers,” 2020). This is in line with Iyan Manuake's research where there is a relationship between parity and the incidence of hyperemesis gravidarum.

3. Based on the results of statistical tests, the value of p=0.407 means that there is no relationship between work and the incidence of hyperemesis gravidarum.

Work in a broad sense is the main activity carried out by almost all women to help meet the needs of their families, in a study submitted by Basmalah Harun where there is no relationship between work and the incidence of hyperemesis gravidarum (Mai dkk., 2019). This is because basically hyperemesis gravidarum is often associated with hormonal changes experienced by pregnant women, namely the hormones HCG and estrogen (Ioannidou dkk., 2019). Apart from hormonal factors, hyperemesis gravidarum is at risk in women with the first condition of pregnancy, or has experienced hyperemesis gravidarum in previous pregnancies.

4. Age of pregnancy

Based on the results of statistical tests, the value of p=0.035 means that there is a relationship between gestational age and the incidence of hyperemesis gravidarum (Prabhu dkk., 2020). The results of this study have many similarities to the results in some literature which states that hyperemesis gravidarum has a relationship with gestational age, namely in the first trimester of pregnancy (Juan & Yang, 2020). Because the HCG hormone increases in the mother's blood in the first trimester of pregnancy, an increase in pregnancy hormones can trigger hyperemesis gravidarum.

This study is in line with Inthan Atika's research where there is a relationship between gestational age and hyperemesis gravidarum.

CONCLUSION

Based on the results of research on factors associated with the incidence of hyperemesis gravidarum, it is concluded as follows:

1. There is a relationship between age and the incidence of hyperemesis gravidarum
2. There is a relationship between parity with the incidence of hyperemesis gravidarum
3. There is no relationship between occupation and the incidence of hyperemesis gravidarum
4. There is a relationship between gestational age and the incidence of hyperemesis gravidarum.

REFERENCES

Agmon, N., Sade, S., Pariente, G., Rotem, R., & Weintraub, A. Y. (2019). Hyperemesis gravidarum and adverse pregnancy outcomes. *Archives of Gynecology and Obstetrics*, *300*(2), 347–353. https://doi.org/10.1007/s00404-019-05192-y

Aiken, A., Lohr, P., Lord, J., Ghosh, N., & Starling, J. (2021). Effectiveness, safety and acceptability of no-test medical abortion (termination of pregnancy) provided via telemedicine: A national cohort study. *BJOG: An International Journal of Obstetrics & Gynaecology*, *128*(9), 1464–1474. https://doi.org/10.1111/1471-0528.16668

Alqahtani, J. S., Njoku, C. M., Bereznicki, B., Wimmer, B. C., Peterson, G. M., Kinsman, L., Aldabayan, Y. S., Alrajeh, A. M., Aldhahir, A. M., Mandal, S., & Hurst, J. R. (2020). Risk factors for all-cause hospital readmission following exacerbation of COPD: A systematic review and meta-analysis. *European Respiratory Review*, *29*(156), 190166. https://doi.org/10.1183/16000617.0166-2019

Amri, A. N., Oscar, S., & Kathryn, M. (2023). The Effect of Civic Education Learning According to Students: Tadris English Students. *International Journal of Educational Narratives*, *1*(2), 93–99. https://doi.org/10.55849/ijen.v1i2.285

Austin, K., Wilson, K., & Saha, S. (2019). Hyperemesis Gravidarum. *Nutrition in Clinical Practice*, *34*(2), 226–241. https://doi.org/10.1002/ncp.10205

Beta, J., Khan, N., Khalil, A., Fiolna, M., Ramadan, G., & Akolekar, R. (2019). Maternal and neonatal complications of fetal macrosomia: Systematic review

and meta-analysis. *Ultrasound in Obstetrics & Gynecology*, *54*(3), 308–318. https://doi.org/10.1002/uog.20279

Bimpong, K. A. A., Khan, A., Slight, R., Tolley, C. L., & Slight, S. P. (2020). Relationship between labour force satisfaction, wages and retention within the UK National Health Service: A systematic review of the literature. *BMJ Open*, *10*(7), e034919. https://doi.org/10.1136/bmjopen-2019-034919

Blais, L., Salah Ahmed, S. I., Beauchesne, M.-F., Forget, A., Kettani, F.-Z., & Lavoie, K. L. (2019). Risk of Postpartum Depression Among Women with Asthma. *The Journal of Allergy and Clinical Immunology: In Practice*, *7*(3), 925-933.e2. https://doi.org/10.1016/j.jaip.2018.09.026

Collins, A., Memtsa, M., Kirk, E., Othman, M., & Abdul Kadir, R. (2022). The risk of venous thromboembolism in early pregnancy loss: Review of the literature and current guidelines and the need for guidance – Communication from the SSC on Women's Health Issues for thrombosis and haemostasis. *Journal of Thrombosis and Haemostasis*, *20*(3), 767–776. https://doi.org/10.1111/jth.15621

Connor, J., Madhavan, S., Mokashi, M., Amanuel, H., Johnson, N. R., Pace, L. E., & Bartz, D. (2020). Health risks and outcomes that disproportionately affect women during the Covid-19 pandemic: A review. *Social Science & Medicine*, *266*, 113364. https://doi.org/10.1016/j.socscimed.2020.113364

Cuff, R. D. (2019). Hyperthyroidism During Pregnancy: A Clinical Approach. *Clinical Obstetrics & Gynecology*, *62*(2), 320–329. https://doi.org/10.1097/GRF.0000000000000435

Davis, C., & Nippita, T. (2020). Hyperparathyroidism in pregnancy. *BMJ Case Reports*, *13*(2), e232653. https://doi.org/10.1136/bcr-2019-232653

Gurol-Urganci, I., Jardine, J. E., Carroll, F., Draycott, T., Dunn, G., Fremeaux, A., Harris, T., Hawdon, J., Morris, E., Muller, P., Waite, L., Webster, K., Van Der Meulen, J., & Khalil, A. (2021). Maternal and perinatal outcomes of pregnant women with SARS-CoV-2 infection at the time of birth in England: National cohort study. *American Journal of Obstetrics and Gynecology*, *225*(5), 522.e1-522.e11. https://doi.org/10.1016/j.ajog.2021.05.016

Ioannidou, P., Papanikolaou, D., Mikos, T., Mastorakos, G., & Goulis, D. G. (2019). Predictive factors of Hyperemesis Gravidarum: A systematic review. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, *238*, 178–187. https://doi.org/10.1016/j.ejogrb.2019.04.043

Juan, J., & Yang, H. (2020). Prevalence, Prevention, and Lifestyle Intervention of Gestational Diabetes Mellitus in China. *International Journal of Environmental Research and Public Health*, *17*(24), 9517. https://doi.org/10.3390/ijerph17249517

Kc, B., Alrasheedy, A. A., Leggat, P. A., Mohamed Ibrahim, M. I., Christopher, C. M., Sapkota, B., & Shrestha, S. (2023). Types and outcomes of pharmacist-managed travel health services: A systematic review. *Travel Medicine and Infectious Disease*, *51*, 102494. https://doi.org/10.1016/j.tmaid.2022.102494

Lindström, V. S., Laitinen, L. M., Nurmi, J. M. A., Koivisto, M. A., & Polo-Kantola, P. (2023). Hyperemesis gravidarum: Associations with personal and family history of nausea. *Acta Obstetricia et Gynecologica Scandinavica*, *102*(9), 1176–1182. https://doi.org/10.1111/aogs.14629

MacGibbon, K. W., Kim, S., Mullin, P. M., & Fejzo, M. S. (2021). HyperEmesis Level Prediction (HELP Score) Identifies Patients with Indicators of Severe Disease:

A Validation Study. *Geburtshilfe und Frauenheilkunde*, *81*(01), 90–98. https://doi.org/10.1055/a-1309-1997

Machitidze, G. G. (2023). Development of the health system in Iran. *Experimental and Clinical Gastroenterology*, *2*, 70–77. https://doi.org/10.31146/1682-8658-ecg-210-2-70-77

Magnus, M. C., Wilcox, A. J., Morken, N.-H., Weinberg, C. R., & Håberg, S. E. (2019). Role of maternal age and pregnancy history in risk of miscarriage: Prospective register based study. *BMJ*, l869. https://doi.org/10.1136/bmj.l869

Mai, C. T., Isenburg, J. L., Canfield, M. A., Meyer, R. E., Correa, A., Alverson, C. J., Lupo, P. J., Riehle-Colarusso, T., Cho, S. J., Aggarwal, D., Kirby, R. S., & National Birth Defects Prevention Network. (2019). National population-based estimates for major birth defects, 2010–2014. *Birth Defects Research*, *111*(18), 1420–1435. https://doi.org/10.1002/bdr2.1589

Medical Tourism Awareness of Health Workers. (2020). *Indian Journal of Forensic Medicine & Toxicology*. https://doi.org/10.37506/ijfmt.v14i4.12890

Mitchell-Jones, N., Lawson, K., Bobdiwala, S., Farren, J. A., Tobias, A., Bourne, T., & Bottomley, C. (2020). Association between hyperemesis gravidarum and psychological symptoms, psychosocial outcomes and infant bonding: A two-point prospective case–control multicentre survey study in an inner city setting. *BMJ Open*, *10*(10), e039715. https://doi.org/10.1136/bmjopen-2020-039715

Nijsten, K., Van Der Minnen, L., Wiegers, H. M. G., Koot, M. H., Middeldorp, S., Roseboom, T. J., Grooten, I. J., & Painter, R. C. (2022). Hyperemesis gravidarum and vitamin K deficiency: A systematic review. *British Journal of Nutrition*, *128*(1), 30–42. https://doi.org/10.1017/S0007114521002865

Ozgunay, S. E., Dincgez, B., Karasu, D., Ozgen, G., Taymur, I., Eminoglu, S., & Ceylan, I. (2022). Adjuvant Hypnotherapy for Hyperemesis Gravidarum: A Randomized Pilot Study. *International Journal of Clinical and Experimental Hypnosis*, *70*(3), 277–285. https://doi.org/10.1080/00207144.2022.2098026

Parikh, N. I., Gonzalez, J. M., Anderson, C. A. M., Judd, S. E., Rexrode, K. M., Hlatky, M. A., Gunderson, E. P., Stuart, J. J., Vaidya, D., & On behalf of the American Heart Association Council on Epidemiology and Prevention; Council on Arteriosclerosis, Thrombosis and Vascular Biology; Council on Cardiovascular and Stroke Nursing; and the Stroke Council. (2021). Adverse Pregnancy Outcomes and Cardiovascular Disease Risk: Unique Opportunities for Cardiovascular Disease Prevention in Women: A Scientific Statement From the American Heart Association. *Circulation*, *143*(18). https://doi.org/10.1161/CIR.0000000000000961

Prabhu, M., Cagino, K., Matthews, K., Friedlander, R., Glynn, S., Kubiak, J., Yang, Y., Zhao, Z., Baergen, R., DiPace, J., Razavi, A., Skupski, D., Snyder, J., Singh, H., Kalish, R., Oxford, C., & Riley, L. (2020). Pregnancy and postpartum outcomes in a universally tested population for SARS-CoV-2 in New York City: A prospective cohort study. *BJOG: An International Journal of Obstetrics & Gynaecology*, *127*(12), 1548–1556. https://doi.org/10.1111/1471-0528.16403

Sacchi, C., Marino, C., Nosarti, C., Vieno, A., Visentin, S., & Simonelli, A. (2020a). Association of Intrauterine Growth Restriction and Small for Gestational Age Status With Childhood Cognitive Outcomes: A Systematic Review and Meta-analysis. *JAMA Pediatrics*, *174*(8), 772. https://doi.org/10.1001/jamapediatrics.2020.1097

Sacchi, C., Marino, C., Nosarti, C., Vieno, A., Visentin, S., & Simonelli, A. (2020b). Association of Intrauterine Growth Restriction and Small for Gestational Age Status With Childhood Cognitive Outcomes: A Systematic Review and Meta-analysis. *JAMA Pediatrics*, *174*(8), 772. https://doi.org/10.1001/jamapediatrics.2020.1097

Sridharan, K., & Sivaramakrishnan, G. (2018). Interventions for treating hyperemesis gravidarum: A network meta-analysis of randomized clinical trials. *The Journal of Maternal-Fetal & Neonatal Medicine*, 1–7. https://doi.org/10.1080/14767058.2018.1519540

Szmuilowicz, E. D., Josefson, J. L., & Metzger, B. E. (2019). Gestational Diabetes Mellitus. *Endocrinology and Metabolism Clinics of North America*, *48*(3), 479–493. https://doi.org/10.1016/j.ecl.2019.05.001

Thapa, S. B., Mainali, A., Schwank, S. E., & Acharya, G. (2020). Maternal mental health in the time of the COVID-19 pandemic. *Acta Obstetricia et Gynecologica Scandinavica*, *99*(7), 817–818. https://doi.org/10.1111/aogs.13894

Wright, D., Wright, A., & Nicolaides, K. H. (2020). The competing risk approach for prediction of preeclampsia. *American Journal of Obstetrics and Gynecology*, *223*(1), 12-23.e7. https://doi.org/10.1016/j.ajog.2019.11.1247

Ye, W., Luo, C., Huang, J., Li, C., Liu, Z., & Liu, F. (2022). Gestational diabetes mellitus and adverse pregnancy outcomes: Systematic review and meta-analysis. *BMJ*, e067946. https://doi.org/10.1136/bmj-2021-067946

Yu, Y., Ma, Q., & Groth, S. W. (2022). Risk factors for preterm birth in pregnancies following bariatric surgery: An analysis of the Longitudinal Assessment of Bariatric Surgery-2. *Surgery for Obesity and Related Diseases*, *18*(11), 1304–1312. https://doi.org/10.1016/j.soard.2022.07.013

Zimmerman, C. F., Ilstad-Minnihan, A. B., Bruggeman, B. S., Bruggeman, B. J., Dayton, K. J., Joseph, N., Moas, D. I., & Rohrs, H. J. (2022). Thyroid Storm Caused by Hyperemesis Gravidarum. *AACE Clinical Case Reports*, *8*(3), 124–127. https://doi.org/10.1016/j.aace.2021.12.005