



Integration of environmental factors and clinical behavior on the differences in betha hemolyticus group b streptococcus colonization in premature and atterm labor

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Abstract

The incidence of LBW in hospitals nationally is 27.9% (POGI, 2018), LBW in Indonesia in 2018 (10.2%) (Ministry of Health of the Republic of Indonesia, 2018), and in 2015 it was 13. The highest percentage was in Maluku North (19.77%), West Kalimantan (19.79%), and West Papua (20.27%), and the lowest percentage in the Riau Islands (8.38%), DI. Yogyakarta (8.9%), and Bali (9.9%). Maternal age significantly influences the course of pregnancy; the chance of premature birth increases as the mother ages. Because it can potentially hurt maternal health during pregnancy, the frequency of parity is one of the risk factors for labor lasting less than one month. Based on initial research conducted in the Maternity Room at TK III Brawijaya Hospital, Surabaya, premature birth occurred in 100 cases in 2023, so the average sample in this study was 80. This hospital still has a preterm birth rate of 80%. Although improvements in careful neonatal monitoring have significantly impacted the survival rates of preterm infants today, incidence rates have not changed much from year to year. This research examines the factors that influence mothers to give birth prematurely. This research uses a cross-sectional method and purposive sampling technique. The total population is 100 respondents from pregnant women who gave birth in the Maternity Room at TK III Brawijaya Hospital. Data analysis shows that the most significant % of respondents experienced a history of childbirth with a history of prematurity, with a percentage of 80%. This means that 80 out of 100 respondents experienced early prematurity during birth. This study also summarizes the findings, recommendations, and ideas for further research collected from data analysis and discussion. The results showed, "There is a significant relationship between perceived maternal behavioral control and maternal behavioral factors infected with various levels of *group B Beta Hemolytic Streptococcus* colonization during delivery." This relationship was identified based on bivariate test analysis, and mothers with differences in *group B Beta Hemolytic Streptococcus* colonization during labor had a significant relationship between environmental factors and behavioral characteristics. These findings indicate that the public's understanding of the dangers of preterm labor coupled with *group B Beta Hemolytic Streptococcus* colonization infection during labor can be influenced by theoretical guidelines about preterm and term labor based on findings, such as factors using maternal behavior theory, so that society can switch from a high-risk life to a better life.

Keywords: Environmental factors and clinical behavior, beta hemolothycus group B colonization, premature and term labor.

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1. Introduction

In contrast to the United States, where premature birth is 11.5%, premature birth is more common in industrialized countries such as Europe, where the incidence rate ranges from 5 to 11%[1]. According to [2], the frequency is still much higher in developing countries, approaching 31% in Sudan, 30% in India, and 15% in South Africa[3]. According Sary *et al.*, 2023

to [4], one baby dies globally due to premature birth every 30 seconds, or more than 1 million babies yearly. The low birth weight (LBW) rate can be used to estimate the frequency of premature births in Indonesia[5]. The incidence of LBW in hospitals nationally is 27.9% (POGI, 2018), LBW in Indonesia in 2018 (10.2%) [6], and in 2015 it was 13. The highest percentage was in Maluku North (19.77%), West

Kalimantan (19.79%), and West Papua (20.27%), and the lowest percentage in the Riau Islands (8.38%), DI. Yogyakarta (8.9%), and Bali (9.9%)[7]. Maternal age significantly influences the course of pregnancy; the chance of premature birth increases as the mother ages[8]. Because it can potentially negatively impact maternal health during pregnancy, parity frequency is a risk factor for labor lasting less than one month[9]. There is no reliable prevention or treatment for preterm labor, a problem in obstetrics. Identifying the cause of preterm labor is essential to prevent or reduce its frequency[10]. Mingling spaces in this research are manifested as a "third space" referred to as the 'Dynamic Third Space'[11]. According to some studies, bacteria can enter the uterus through the fallopian tubes from the abdominal cavity, syringe contamination during amniocentesis or chorionic villi sampling, the placenta due to hematogenous spread, passage through the cervix from the vagina, or ascending spread of bacteria from the vagina or cervical canal in women pregnant[12].

Maternal factors, such as maternal age between 20 and 35 years, gestational spacing, maternal parity, work factors that are too heavy, fetal and placental factors, such as pregnancy with hydramnios, multiple pregnancies, antepartum hemorrhage, premature rupture of membranes, and infection of the uterus, are factors that cause premature birth [13]. *Group B Streptococcus Beta Haemolyticus* infection is one of the infections that can occur. According to[14], *Group B Streptococcus Betha Haemolyticus*, the main contributor to sepsis, pneumonia, and meningitis in newborns, is a member of the natural flora of the female vaginal tract[15]. Neonatal infection with *Group B Haemolytic Streptococcus* (GBS) or *Streptococcus agalactiae* has increased newborns' morbidity and mortality rates globally in both rich and developing countries[16]. This type of bacteria can cause premature rupture of membranes and is often seen in women's reproductive organs[17]. These bacteria can easily infect babies and can also cause several diseases[18]. Infant deaths are most often caused by prematurity[19]. Premature birth is another factor contributing to Indonesia's increasing infant mortality rate[20]. Germ infections have several different effects besides the possibility of premature birth[21]. The objective of this study was to determine the determinants between Community-Based Total Sanitation and the incidence of diarrhea in toddler at communities near rivers[22]. These effects can include low birth weight, restricted fetal growth, and a tendency to get sick due to an underdeveloped immune system[23]. The baby's underdeveloped lungs and liver make it unable to survive outside the womb, increasing the risk of death[24]. Based on preliminary research conducted in the delivery room of TK III Brawijaya Hospital Surabaya, preterm birth will occur in 100 babies by 2023[25]. Although improvements in careful neonatal monitoring have significantly impacted the survival rate of premature babies, the incidence rate is not much changes from year to year[6]. Infant deaths are most often caused by prematurity[26]. Premature birth is another factor contributing to Indonesia's increasing infant mortality rate[27]. Germ infections have several different effects besides the possibility of premature birth[28]. These effects can include low birth weight, restricted fetal growth, and a tendency to get sick due to an

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underdeveloped immune system[29]. The baby's underdeveloped lungs and liver make it unable to survive outside the womb, increasing the risk of death[24] Based on initial research conducted in the delivery room of the Dr. Regional General Hospital[30]. Soetomo Surabaya, preterm birth occurred in 196 babies in 2013 and 87 births between January and July 2014[31]. This hospital still has a preterm birth rate of 20%[32]. Although improvements in careful neonatal monitoring have significantly impacted the survival rates of preterm infants today, incidence rates have not changed much from year to year[33]. Based on the description above, researchers want to know more about clinical behavior and environmental factors that might contribute to variations in Group B *Streptococcus Haemolyticus* bacterial colonization between preterm and term labor[34].

2. Research Methods

2.1 Study Population

The population of this study was all mothers who gave birth in the Maternity Room at TK III Brawijaya Surabaya, both premature and term births. The research was carried out for 2 (two) months, namely August and September 2023. The sampling technique used purposive sampling from 100 pregnant women who gave birth in the Maternity Room at TK III Brawijaya Surabaya. This research is a quantitative research using a cross-sectional approach[35].

2.2 Data Collection

The instrument in this research is a questionnaire[36]. The questionnaire in this study was used to measure attitudes toward behavior, subjective norms, perceived behavioral control, intentions, and stroke awareness behavior using the Theory of Planned Behavior guidelines.

2.3 Statistic analysis

Descriptive analysis of maternal factors based on the criteria for premature birth: Mother giving birth at reproductive age (20 - 35 years), Previous history of prematurity, No other comorbidities such as Diabetes Mellitus, Heart Disease, etc., Willing to be included in the research.

3. Results and Discussion

3.1 Results

a. The relationship between maternal perceived behavioral control and behavioral factors of mothers infected with differences in group B Streptococcus Beta Hemolyticus colonization at delivery time.

The following are the results of bivariate tests to see the relationship between maternal perceived behavioral control and behavioral factors of infected mothers. Differences in group B *Streptococcus Beta Hemolyticus* colonization during childbirth are shown in Table 1 below: The chi-square test results are based on sig = 0.05 and the relationship between the mother's perceived behavioral control and the behavioral factors of mothers who are infected[37]. The difference in the colonization of *Streptococcus Beta Hemolyticus* group B is significant at 0.000 because the p-value < α then the conclusion is that H0

is rejected, meaning that behavior has a relationship with the control behavior of mothers who gave birth prematurely and at term who were infected with differences in colonization of Beta Hemolyticus group B.

b. The relationship between environmental factors and behavioral factors of infected mothers. Differences in colonization of Beta Hemolyticus Group B at the time of delivery.

The following are the results of bivariate tests carried out to see the relationship between maternal environmental factors and behavioral factors of infected mothers. Differences in the colonization of Group B Streptococcus Beta Hemolyticus during delivery are shown in Table 2 below. The chi-square test results are based on sig = 0.05 and the relationship between maternal factors and behavioral factors of mothers who are infected. The difference in the colonization of Streptococcus Betha Hemolyticus group B is significant at 0.000 because the p-value < α . The conclusion is that H0 is rejected, meaning behavior is related to control behavior. Mothers who gave birth prematurely and at term who were infected with differences in group B Streptococcus Beta Hemolyticus colonization.

c. The relationship between the behavioral characteristics of mothers with differences in Beta hemolytic group B colonization at birth and the mother's perceived behavioral control.

The conclusion is that H0 is rejected because behavior has a relationship with the behavioral control of mothers who give birth prematurely and at term who are

infected with group B Streptococcus Betha Hemolyticus bacteria. Based on the chi-square test results with sig = 0.05 and the relationship between Maternal Perceived Behavioral Control and Maternal Behavioral Factors. Infected with Betha Hemolyticus Group B Colonization Differences have a significance of 0.000.

3.2 Discussion

Researchers found that the history of childbirth experienced by the most significant portion of respondents was in the range of experiencing a history of prematurity with a percentage of 80 %. This means that 80 people sampled experienced early prematurity during the birth process. This research also summarizes the findings, recommendations, and ideas for further research gathered from the analysis and discussion of the data. The results show that:

1. There was a significant relationship between perceived maternal behavioral control and maternal behavioral factors infected with various levels of group B beta hemolyticus colonization during delivery. This relationship was identified based on bivariate test analysis.
2. Mothers with differences in group B beta-hemolytic colonization during labor had a significant relationship between environmental factors and behavioral characteristics.

Public understanding of the dangers of preterm labor coupled with group B beta-hemolytic colonization infection during labor can be influenced by theoretical guidelines on preterm and term labor based on findings, such as factors using maternal behavior theory so that society can move away from a high-risk life. To a better life.

Tabel 1: Uji Bivariat Variable X1 with Variabel Y

Chi-Square Tests	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	340.310 ^a	182	.000
Likelihood Ratio	178.191	182	.566
Linear-by-Linear Association	16.207	1	.000
N of Valid Cases	100		

a. 209 cells (99.5%) have expected count less than 5. The minimum expected count is .02.

Tabel 2: Uji Bivariat Variable X1 with Variabel Y

Chi-Square Tests	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	438.663 ^a	210	.000
Likelihood Ratio	195.253	210	.759
Linear-by-Linear Association	24.399	1	.000
N of Valid Cases	100		

a. 239 cells (99.6%) have expected count less than 5. The minimum expected count is .01.

4. Conclusions

Statistical analysis showed that reproductive age (20 – 35 years), previous history of prematurity, history of respondent disease, and willingness to be included in the study were significantly correlated. So, the younger the age of a mother giving birth, a history of previous illnesses, and unfavorable environmental factors, the more it will affect a mother giving birth with premature labor. Researchers found that the variable number of mothers who experienced premature labor was 80 people out of 100 respondents at the hospital.

References

- [1] M. Daley, L. S. Sadler, and H. D. Reynolds. (2013). Tailoring clinical services to address the unique needs of adolescents from the pregnancy test to parenthood. *Current Problems in Pediatric and Adolescent Health Care*. vol. 43, no. 4, pp. 71–95.
- [2] H. Blencowe. (2020). Counting the smallest: data to estimate global stillbirth, preterm birth and low birthweight rates. *London School of Hygiene & Tropical Medicine*, 2020.
- [3] T. Bekuma, T., Firrisa, B., Negero, M. G., Kejela, G., & Bikila, H. (2020). Factors affecting choice of childbirth place among childbearing age women in Western Ethiopia: a community-based cross-sectional study. *International Journal of Reproductive Medicine*, 2020, Article ID 4371513.
- [4] B. Caroli and I. Widiastuti. (2019). Factors associated with the incidence of preterm labor at the Muhammadiyah Taman Puring Kebayoran Baru Hospital, South Jakarta, January-June 2017 period. *Nursing & Midwifery Research Journal*. vol. 1, no. 1.
- [5] R. Dratista. (2022). Risk Factors for Preterm Labor Risk Factors of Preterm Labor. *Midwifery Science Journal*. vol. 9, no. 1.
- [6] Indonesian Ministry of Health. (2020). Program Action Plan 2020-2024. Jakarta.
- [7] S. S. T. Ginting. (2022). Factors affecting the event of premium delivery. *Jurnal Aisyah: Jurnal Ilmu Kesehatan*. vol. 7, no. 2, pp. 673–676.
- [8] M. Siregar, J. L. Simbolon, and E. S. Sitompul. (2020). Pemberdayaan Anak Remaja dalam Pencegahan Kehamilan Usia Dini di SMA Swasta Santa Maria Tarutung. *Jurnal Pengabdian Kepada Masyarakat*. vol. 2, no. 2, pp. 95–99.
- [9] R. P. Santoso and J. Sriyana. (2020). The effect of idiosyncratic shocks on labor market outcomes of informal households in Indonesia. *Jurnal Ekonomi Malaysia*. vol. 54, no. 2, pp. 13–27, 2020.
- [10] Lautarescu. (2020). Maternal prenatal stress is associated with altered uncinat fasciculus microstructure in premature neonates. *Biological Psychiatry*. vol. 87, no. 6, pp. 559–569.
- [11] D. Dewiyanti, A. Andiyan, D. A. Hertoeity, and T. W. Natalia. (2023). The Production of Mingling Spaces as a Form of Children’s Mobility. *Journal of Civil Engineering, Environment and Architecture*. vol. 11, no. 6, pp. 3389–3413. doi: 10.13189/cea.2023.110613.
- [12] Díaz-Rodríguez, L. Feliz-Matos, and C. B. R. Matuk. (2021). Risk factors associated with preterm birth in the Dominican Republic: a case-control study. *BMJ Open*. vol. 11, no. 12, p. e045399.
- [13] E. Hadiwijaya and A. Kumala. (2019). The relationship between teenage pregnancies and the incidence of low birth weight (LBW) babies in Ciawi Regional Hospital-Bogor Regency for the 2016-2017 period. *Tarumanagara Medical Journal*. vol. 1, no. 2.
- [14] F. Husna, M. Aldika Akbar, and R. Amalia. (2021). Complications of Pregnancy and Childbirth in Teen Pregnancy. *Indonesian Midwifery and Health Sciences Journal*. vol. 3, no. 2.
- [15] J. Sembiring and S. Pratiwi. (2019). The relationship between age, parity and gestational age with low birth weight babies at Medan Medan Partner General Hospital.
- [16] T. Meihartati. (2019). The relationship between early pregnancy and the incidence of premature labor in the delivery room of Paradise Mother and Child Hospital in 2015. *Delima Azhar Journal*. vol. 2, no. 1.
- [17] E. L. Haksari, (2019). Historical Perspectives: Low Birthweight and Preterm Infants in Indonesia. *Neoreviews*, 20(10), e548-e560.
- [18] N. Zulaikha and F. Minata. (2021). Analysis of the Determinants of Premature Birth at RSIA Rika Amelia Palembang. *Keyhole Surgery Proceedings journal*. vol. 4, no. 1, 2021.
- [19] R. Ningsih. (2012). Factors Related to The Incident of Premature Birth. *Ministry of Health. Tajung Karang*. vol. 5, no. 2.
- [20] I.Rahmawati, Absari, N., & Andini, P. (2021). Faktor-Faktor Yang Berhubungan dengan Persalinan Prematur. *Professional health journal*, 2(2), 112-121.
- [21] H. A. D.Sukma, & Tiwari, S. (2021). Risk Factors for Premature Birth in Indonesia. *Jurnal Biometrika dan Kependudukan*, 10(1), 61-7.
- [22] F. P. S. Indah, T. Cardiah, A. Rahmat, K. Sulandjari, A. Andiyan, and N. Hendayani. (2022). Effect of Community-Based Total sanitation Program with diarrhea Incidents in toddler at communities near rivers. *Materials Today: Proceedings*.
- [23] T. Vrijkotte, T. Brand, and G. Bonsel. (2021). First trimester employment, working conditions and preterm birth: a prospective population-based cohort study. *Occupational & Environmental Medicine*. vol. 78, no. 9, pp. 654–660, 2021.
- [24] N. Loviana, N. Darsini, and A. Aditiawarman. (2021). Factors Related to the Incident of Premature Labor at Dr Soetomo Hospital. *Indonesian Midwifery and Health Sciences Journal*. vol. 3, no. 1, 2021.
- [25] S. Nurul. (2022). Factors Related to The Incident of Premate Labor in Cibinong Hospital, Bogor District.

- Indonesian Midwifery and Health Sciences Journal. vol. 1, no. 1, 2022.
- [26] U. Rizki, M. Nyorong, D. Theo, and I. Anggraini. (2022). Influence Factors of Effective Communication of Health Officers on Patient Satisfaction. *Jurnal Perilaku Kesehatan Terpadu*. vol. 1, no. 1, pp. 46–59.
- [27] R. Nuzula and D. Kurniawati. (2020). Relationship between teenage pregnancies and the incidence of low birth weight (Bblr) babies at Panembahan Senopati Hospital. *Jurnal Kesehatan Samodra Ilmu*. vol. 11, no. 2.
- [28] S. Shamsu. (2019). *Psychology and Child Development*. Bandung: Rosdakarya.
- [29] H. Purwandari and M.-C. Huang. (2020). (Short-term Outcomes of Preterm Infants in a Medical Center at Banyumas Regency, Indonesia: A Preliminary Study. *Babali Nursing Research*. vol. 1, no. 2, pp. 47–57, 2020.
- [30] Rahmawati, V. Mutiara, N. Siska Absari, and P. Andini. (2021). Factors Associated with Premature Delivery,” *Prof. Heal. J.*, vol. 2, no. 2, 2021.
- [31] I. D.Utomo, & Utomo, A. (2013). Adolescent pregnancy in Indonesia: A literature review. *Australian Demographic and Social Research Institute The Australian National University*.
- [32] M. A. Talib, N. K. MUTALIB, S. M. Shahabudin, and A. Mahmud. (2020). Household income and life satisfaction of single mothers in Malaysia. *International Journal For Studies On Children, Women, The Elderly and Persons with Disabilities*. vol. 9, pp. 75–83.
- [33] P. Rochjati (2023). *Antenatal Screening for Pregnant Women*, 2nd ed. Surabaya: UNAIR Publishing and Printing Center.
- [34] R. Seyama. (2020). Retrospective study of the recurrence risk of preterm birth in Japan. *The Journal of Maternal-Fetal & Neonatal Medicine*. vol. 18, pp. 1–5.
- [35] T. Mahmudiono, Q. Rachmah, D. Indriani, E. A. Permatasari, N. A. Hera, and H.-L. Chen. (2022). Food and beverage consumption habits through the perception of health belief model (grab food or go food) in surabaya and pasuruan. *Nutrients*. vol. 14, no. 21, p. 4482.
- [36] E. S. D. Manurung, F. I. Salsabila, P. T. P. Wirawan, N. D. Anggraini, and M. G. R. Pandin. (2022). Identity Crisis As A Threat among Indonesian Young Generations. *Populasi*. vol. 30, no. 1, pp. 1–9.
- [37] B.M.E. Bochere. (2018). *Relationship Between Parental Conflict, Family Structure and Bullying Among Public Secondary School Students in Kiambu County, Kenya*. Kenyatta University. 2018.