



# Relationship between Gestational Age and Examination Results Triple Elimination of Pregnant Women at UPTD Jayakarta Community Health Center

Rika Nurhasanah<sup>1\*</sup>, Fitri Kurnia Anggraeni<sup>1</sup>

<sup>1</sup> Faculty of Health Sciences and Technology, Jenderal Achmad Yani University, Cimahi, Indonesia.

Received: June 21, 2024

Revised: August 03, 2024

Accepted: November 25, 2024

Published: November 30, 2024

Corresponding Author:

Author Rika Nurhasanah

[Rikanurkhasanah09@gmail.com](mailto:Rikanurkhasanah09@gmail.com)

DOI: [10.29303/jppipa.v10i11.8725](https://doi.org/10.29303/jppipa.v10i11.8725)

© 2024 The Authors. This open access article is distributed under a (CC-BY License)



**Abstract:** Human Immunodeficiency Virus (HIV), Syphilis, and Hepatitis B are sexually transmitted infections that pregnant women can pass to their babies. To address this, the Ministry of Health of the Republic of Indonesia has implemented the Triple Elimination program based on WHO recommendations. This study aims to evaluate the effectiveness of the Triple Elimination screening compared to gestational age. Using the Chi-Square method, the research involved 47 pregnant women examined in the first, second, and third trimesters. Data was collected from reports of initial screenings in the first trimester, followed by re-examinations in the subsequent trimesters. A questionnaire with six questions was used. Statistical analysis with a p-value of 0.06 indicated a significant correlation between sexual intercourse habits and an increase in syphilis cases in the third trimester. Additionally, habits related to genital cleaning post-intercourse also significantly impacted syphilis rates. The study highlights the need for ongoing education for pregnant women on preventing sexually transmitted infections and the importance of early detection through Triple Elimination screenings.

**Keywords:** Gestational age; Pregnant mother; Risk factors; Triple elimination

## Introduction

Pregnancy is defined as fertilization or union of spermatozoa and ovum and followed by nidation or implantation. If calculated from the time of fertilization until the birth of the baby, a normal pregnancy will last for 40 weeks or 10 months or 9 months according to the international calendar. Pregnancy is divided into 3 trimesters where the first trimester lasts 12 weeks, the second trimester 15 weeks (13<sup>th</sup> to 27<sup>th</sup> week), and the third trimester 13 weeks (28<sup>th</sup> to 40<sup>th</sup> week) (Prawirohardjo, 2014).

Literature data states that more than 90% of directly infectious diseases in babies, such as HIV infection, Syphilis and Hepatitis B originate and are transmitted from infected mothers. Vertical transmission can occur

during pregnancy, during childbirth and during breastfeeding. In HIV-infected pregnant women, without appropriate early treatment, half of the children born will be infected with HIV and half of the HIV-infected children will die before their second birthday. In pregnant women infected with Syphilis, without adequate treatment, then 67% of babies will be infected, some pregnancies will end in abortion, stillbirth, born then died or Congenital Syphilis. Likewise in pregnant women with Hepatitis B, 95% of babies will be infected and if the baby does not receive complete standard treatment with active immunization and passive immunization shortly after birth, then the baby will not get protection. Approximately 90% of babies infected with Hepatitis B at birth or during the perinatal period have the potential to become chronic with the risk of

## How to Cite:

Nurhasanah, R., & Anggraeni, F. K. (2024). Relationship between Gestational Age and Examination Results Triple Elimination of Pregnant Women at UPTD Jayakarta Community Health Center. *Jurnal Penelitian Pendidikan IPA*, 10(11), 8538–8543. <https://doi.org/10.29303/jppipa.v10i11.8725>

various complications, ranging from severe chronic hepatitis, cirrhosis and liver cancer, as well as being a source of transmission of Hepatitis B throughout their lives (Indonesian Ministry of Health, 2017).

There are infectious diseases that can be transmitted by pregnant women to their babies during pregnancy, childbirth and breastfeeding, such as: Human Immunodeficiency Virus (HIV), T. Pallidum, and Hepatitis B infections. The consequences of being infected with HIV, Syphilis, and Hepatitis B in babies can result in illness, disability and death, thus having a negative impact on the continuity and quality of life of children. However, this can be prevented by carrying out examinations as early as possible (early detection) during antenatal care, early treatment, and providing immunizations (Indonesian Ministry of Health, 2019).

More than 90% of children contract HIV, syphilis and hepatitis B infections from their mothers. The prevalence of HIV, Syphilis and Hepatitis B infection in pregnant women is 0.3, 1.7, and 2.5% respectively. The risk of mother-to-child transmission for HIV is 20-45%, for Syphilis is 69-80%, and for Hepatitis B is more than 90%. HIV infection in newborns from mothers  $\leq 50$  cases per 100,000 live births and HIV transmission, Syphilis transmission  $\leq 50$  cases per 100,000 live births, Hepatitis B transmission  $\leq 50$  babies per 100,000 live births. In the context of Eliminating Transmission, district/city Regional Governments are responsible for creating and implementing policies in promotive, preventive, curative and rehabilitative services at the district/city level guided by national policies (Indonesian Ministry of Health, 2017).

Efforts to break the chain of transmission of HIV, Syphilis and Hepatitis B from pregnant women to their babies, one of which is through examination triple elimination. Triple elimination is a program that aims to achieve and maintain the elimination of mothers to babies from HIV/AIDS, Hepatitis B, and Syphilis. Examination triple Elimination of pregnant women is carried out in the first trimester, 0-12 weeks of gestation, the risk of transmission is only (1%). In the second trimester 13-27 weeks the risk of transmission is higher, namely (4%) and in the third trimester 28-40 weeks the risk of transmission is (12%) (Indonesian Ministry of Health, 2019).

In 2022, service achievements Ante Natal Care (ANC) at the Jayakarta Community Health Center has reached 93% but not all mothers have had examinations triple elimination (81%), even though there were cases of HIV, Syphilis or HBsAg found in as many as 5 people out of 248 (2%). During 2022, there are cases that show results triple different elimination results, namely negative results in the 1<sup>st</sup> trimester and positive results in the 2<sup>nd</sup> trimester. This could be caused by the ongoing period window period as well as the results of new

infections (Indonesian Ministry of Health, 2017). According to the Center for Disease Control and Prevention (2022), HIV testing using the rapid test method can only be detected in 18-90 days, hepatitis B in 90 days, and syphilis in 10-90 days. In this research, an examination will be carried out triple elimination in each trimester and identifying the causes of changes in results triple elimination in each trimester according to gestational age (Center for Disease Control and Prevention, 2022).

Considering the importance of the health status of the mother and child, health workers must try to reduce the risk of complications that may occur during pregnancy. Therefore, the author is interested in conducting research on the relationship between gestational age and examination results triple elimination of pregnant women at the Jayakarta Community Health Center.

## Method

The research method utilized Chi-Square analysis to explore the relationship between gestational age and the results of Triple Elimination screenings in pregnant women. Triple Elimination refers to the screening for three sexually transmitted infections (STIs): Human Immunodeficiency Virus (HIV), Syphilis, and Hepatitis B (HBsAg). This approach is designed to prevent the transmission of these infections from pregnant women to their babies, in line with the Ministry of Health of the Republic of Indonesia's guidelines and the recommendations of the World Health Organization (WHO). The study was conducted at the Jayakarta Community Health Center, focusing on a sample of 47 pregnant women. Each participant was subjected to Triple Elimination screenings during three different stages of pregnancy: the first trimester, the second trimester, and the third trimester. This longitudinal approach allowed for the assessment of how gestational age might influence the results of these screenings and provided a comprehensive view of the infection status throughout the pregnancy.

Data collection involved several key steps. Initially, informed consent was obtained from all participants, ensuring that they were fully aware of the study's objectives and procedures. Following this, each pregnant woman completed a questionnaire designed to gather information about her sexual and health history, which could influence the risk of STIs. Blood specimens were then collected from each participant during the screening visits. These samples were tested for HIV, Syphilis, and Hepatitis B (HBsAg). The results of these tests were meticulously recorded for each trimester, allowing for a detailed comparison of infection rates and trends over the course of the pregnancy (Furtado et al.,

2022; Xia et al., 2024; Timmermans et al., 2015). The research procedure also included rigorous data processing and analysis. The Chi-Square test was employed to statistically examine the relationship between gestational age and the results of the Triple Elimination screenings. This analysis aimed to identify any significant correlations between the timing of the screenings and the presence or absence of infections.

Result and Discussion

Table 1. Distribution of positive result data triple elimination of Trimester I, II, and III

Gestational Age	Syphilis	HIV	HbsAg
Trimester I	1	0	0
Trimester II	5	1	1
Trimester III	7	1	3
Total	8	6	4

Table 1 shows that there are differences and an increase in the number of reactive results for each parameter triple elimination. This triple elimination examination is a government program to reduce pregnant women's infection of newborns from the transmission of HIV/AIDS, Syphilis and Hepatitis B, improve the quality of life of infected mothers and children, increase the professionalism of health workers in handling sexually transmitted infections, and eliminate disease-based stigma (Indonesian Ministry of Health, 2019). HIV and syphilis examinations use strips for antibody detection, while Hepatitis B uses antigen detection strips (Kurti et al., 2018; Pham et al., 2024; Yuan et al., 2024).

The results of this study are in line with several studies which states that the incidence of HIV positive among pregnant women who undergo a repeat HIV test in the 3<sup>rd</sup> trimester of pregnancy after receiving a negative result from the first examination is 1.2/1,000 women per year (Bell et al., 2023; Feng et al., 2022; Matthews et al., 2023). The results of this study also show that re-testing for HIV is 8.2 times more cost-effective than not re-testing for HIV based on quality-adjusted life year (QALY), which is a general measure of the burden of disease, including the quality and quantity of life lived (Chasanah et al., 2021). In some cases, Hepatitis B infection is only discovered after examination before delivery (Dhyanaputri et al., 2019). This is the same as the results of research which showed that there were 3 reactive cases in the third trimester. Perinatal transmission of hepatitis B remains a common mode of viral transmission. The perinatal period starts from 28 weeks' gestation - 28 days post-partum, so it requires good management for pregnant women who are infected (Kesty & Bernolian, 2022).

The results of the study showed the presence of syphilis. In the first trimester there was only 1, increasing to 5 and 7 in the second and third trimesters. Pregnant women with syphilis can transmit this disease to the fetus through the placenta to the fetus's body, especially if this disease is not treated and occurs at 14 – 27 weeks of gestation. Syphilis infection that occurs in the womb can give birth to a baby with syphilis, which is called congenital syphilis. Laboratory examinations by taking blood samples from pregnant women must be carried out as early as possible at 1-13 weeks of gestation so that treatment can be carried out immediately to reduce the risk of transmission, disability and even death to the fetus (Berlian et al., 2023; Hutapea et al., 2023; Rahayu et al., 2016; Roy et al., 2020). The examination must also be carried out again if the pregnant woman is diagnosed with another sexually transmitted disease during pregnancy (Indira, 2023).

Table 2. Behavioral data of research objects during pregnancy

Behavior	Of	No	Total (n)
Use condoms during intercourse	12	35	47
Changing partners / changing husbands	0	47	47
Clean the genitals	31	16	47
Feeling itchy/smelly vaginal discharge in the genital area	19	28	47
Pain in the genitals during intercourse	2	45	47
Having sexual relations during pregnancy	27	20	47

Next, a statistical test was carried out to see whether there was a relationship between the habits and behavior of the research sample during pregnancy and the improvement in results triple elimination. Statistical test using Chi-square.

Table 2 shows the results of interviews with pregnant women regarding the mother's healthy living behavior during pregnancy. The interview results showed that 74% of the sample did not use condoms during intercourse (Atuhaire et al., 2021; Hadders-Algra et al., 2023; Madi et al., 2010). Statistical results show that there is no significant relationship between condom use and the increase in cases. Using condoms can reduce the risk of transmitting syphilis (Stoltey & Cohen, 2015). Using condoms can also reduce the risk of sexually transmitted infections including HIV and Hepatitis B if used consistently with the correct method of use. Condoms must be used by all partners, whether one or both are infected (Indonesian Ministry of Health, 2019). This shows that if condoms are not used, it could cause higher cases (Nawasari, 2023).

Several samples showed risk factors for itching or smelly vaginal discharge on the genitals. All women of all ages can experience vaginal itching (Ayuningtyas &

Suryaatmaja, 2011). This itching and vaginal discharge is caused by fungi and parasites such as pinworms or protozoa (*Trichomonas vaginalis*) and Bacterial Vaginosis. Vaginal discharge caused by *Candida* is 53%, *Trichomonas* is 3.1% and is classified as Bacteria 40.1%. Cholifah et al. (2021) shows that the most dominant risk

factor is always cleaning the genitals, assuming that washing the genitals with betel soap will kill disease germs, so that respondents feel clean and safe from STIs and HIV & AIDS even if they have sex without using a condom (Widodo, 2009).

**Table 3.** Statistical data on the relationship between behavior during pregnancy and outcomes triple elimination

	Use condoms during sexual intercourse	Change partners	Always clean your genitals	Itching/smelly vaginal discharge in the genital area	Every time I have sex, I complain of pain in my genitals	During pregnancy have sexual intercourse
Trimester 1						
HIV	-	-	-	-	-	-
Syphilis	-	-	0.113	0.121	0.146	0.110
HbsAg	-	-	-	-	-	-
Trimester 2						
HIV	-	-	0.121	0.114	-	0.111
Syphilis	0.092	-	0.066	0.097	0.092	0.063
HbsAg	-	-	0.101	-	-	-
Trimester 3						
HIV	-	-	0.116	-	-	-
Syphilis	0.113	-	0.039*	0.072	-	0.050*
HbsAg	0.061	-	-	-	-	0.082

Note: sig p-value < 0.05

Reactive results in the research sample indicate the need for various follow-up efforts for pregnant women. Pregnant women who have been identified need to improve their quality of life and prevent perinatal infections of the fetus (Karoud et al., 2020; Sanders et al., 2018; Zhang et al., 2021). Mothers who are not infected need to prevent infection during pregnancy and throughout their life, by having safe sexual relations.

Table 3 results of statistical tests on the relationship between behavior during pregnancy and outcomes triple Elimination using a p-value < 0.05 shows that there is a significant relationship between sexual intercourse behavior and the increase in the number of syphilis in the third trimester. Apart from that, there were significant results on the behavior of cleaning the genitals after intercourse on an increase in the number of syphilis.

Conclusion

Based on research conducted on 47 pregnant women, it was found that the results triple elimination experienced changes in the HIV examination parameters, there was one reactive pregnant woman in the second trimester, the syphilis examination parameters five reactive pregnant women in the second trimester and two reactive pregnant women in the third

trimester, in the HBsAg examination parameters there was one reactive pregnant woman in the second trimester and one reactive pregnancy in the third trimester. Changes in examination results triple This elimination also looks at risk factors that influence examination results triple elimination. From the results of statistical tests, the relationship between behavior and conditions and results triple elimination using p-value < 0.05 to show that there is a significant relationship. Statistical results show that there is a significant relationship between sexual intercourse habits and the increase in the number of syphilis in the third trimester.

Acknowledgments

The author would like to thank the Jayakarta Community Health Center for giving permission to conduct research in the Jayakarta Community Health Center working area. The author also would like to thank all the reviewers who have contributed to making this journal eligible for publication.

Author Contributions

R.N., and F.K.A., assists in the data collection process, data processing and analysis, as well as writing the article.

Funding

This research no funded.

Conflicts of Interest

The research has no conflicts of interest.



## References

- Atuhaire, P., Matovu, F., Nakalega, R., Kataike, H., Nabwana, M., Lukyamuzi, Z., & Guwattude, D. (2021). Time to First Viral Load Testing Among Pregnant Women Living with HIV Initiated on Option B+ at 5 Government Clinics in Kampala city, Uganda: Retrospective Cohort Study. *International Journal of Infectious Diseases*, 104, 526–531. <https://doi.org/10.1016/j.ijid.2021.01.005>
- Ayuningtyas, D. N., & Suryaatmaja, L. (2011). *Hubungan antara Pengetahuan dan Perilaku Menjaga Kebersihan Genitalia Eksterna dengan Kejadian Keputihan pada Siswi SMA Negeri 4 Semarang* (Undergraduate Thesis). FK Undip, Semarang. Retrieved from <http://eprints.undip.ac.id/32942/>
- Bell, L., Gemert, C. V., Allard, N., Brink, A., Chan, P. L., Cowie, B., Hellard, M., Homer, C. S. E., Howell, J., O'Connor, M., & Hocking, J. (2023). Progress Towards Triple Elimination of Mother-to-Child Transmission of HIV, Hepatitis B and Syphilis in Pacific Island Countries and Territories: A Systematic Review. *The Lancet Regional Health - Western Pacific*, 35, 100740. <https://doi.org/10.1016/j.lanwpc.2023.100740>
- Berlian, G., Riani, C., Kurniati, N. F., & Rachmawati, H. (2023). Peptide Derived C. striata Albumin as a Natural Angiotensin-Converting Enzyme Inhibitor. *Heliyon*, 9(5), e15958. <https://doi.org/10.1016/j.heliyon.2023.e15958>
- Center for Disease Control and Prevention. (2022). *Understanding the HIV Window Period*. Retrieved from <https://www.cdc.gov/hiv/basics/hiv-testing/hiv-window-period.html>
- Chasanah, S., Dewanti, L., & Anis, W. (2021). The Influence of Internal Factors of Pregnant Women on Triple Elimination Examination. *Indonesian Midwifery and Health Sciences Journal*, 5(1), 88–102. <https://doi.org/10.20473/imhsj.v5i1.2021.88-102>
- Cholifah, R. D. N., K, P. A., & Azizah, N. (2021). Pemakaian Sabun Antiseptik dengan Kejadian Keputihan. *Midwifery Jurnal Kebidanan*, 7(2), 85–92. <https://doi.org/10.21070/midwifery.v7i2.1320>
- Dhyana Putri, I. G. A. S., Sundari, C. D. W. H., Mastra, I. N., Jirna, I. N., Arjani, I. A. M. S., Merta, I. W., Sudarmanto, I. G., & Sarihati, I. G. A. D. (2019). Penyuluhan dan Skrining Hepatitis B pada Ibu Hamil dengan Rapid Tes Di Kecamatan Kediri Kabupaten Tabanan Tahun 2018. *Jurnal Pengabmas Masyarakat Sehat*, 1(2), 95–103. <https://doi.org/10.33992/ms.v1i2.628>
- Feng, Y., Zheng, H., Fang, D., Mei, S., Zhong, W., & Zhang, G. (2022). Prediction of Late-Onset Fetal Growth Restriction Using a Combined First- and Second-Trimester Screening Model. *Journal of Gynecology Obstetrics and Human Reproduction*, 51(2), 102273. <https://doi.org/10.1016/j.jogoh.2021.102273>
- Furtado, M., Chen, L., Chen, Z., Chen, A., & Cui, W. (2022). Development of Fish Collagen in Tissue Regeneration and Drug Delivery. *Engineered Regeneration*, 3(3), 217–231. <https://doi.org/10.1016/j.engreg.2022.05.002>
- Hadders-Algra, M., Iersel, P. A. M. V., Heineman, K. R., & Gemert, S. L. B-V. (2023). Longer Duration of Gestation in Term Singletons is Associated with Better Infant Neurodevelopment. *Early Human Development*, 181(April), 105779. <https://doi.org/10.1016/j.earlhumdev.2023.105779>
- Hutapea, T. P. H., Madurani, K. A., Syahputra, M. Y., Hudha, M. N., Asriana, A. N., Suprpto, S., & Kurniawan, F. (2023). Albumin: Source, Preparation, Determination, Applications, and Prospects. *Journal of Science: Advanced Materials and Devices*, 8(2), 100549. <https://doi.org/10.1016/j.jsamd.2023.100549>
- Indira, I. G. A. A. E. (2023). *Syphilis in Babies and Children (Congenital Syphilis)*. Retrieved from [https://yankes.kemkes.go.id/view\\_artikel/2410/sifilis-pada-bayi-dan-anak-sifilis-kongenital](https://yankes.kemkes.go.id/view_artikel/2410/sifilis-pada-bayi-dan-anak-sifilis-kongenital)
- Indonesian Ministry of Health. (2017). *Regulation of the Minister of Health of the Republic of Indonesia Number 52 of 2017 Concerning Elimination of Transmission of Human Immunodeficiency Virus, Syphilis and Hepatitis B from Mother to Child*. Retrieved from <http://regulasi.bkpk.kemkes.go.id/detail/25417208-5c1c-40e4-a420-a28179535abf/unduh/>
- Indonesian Ministry of Health. (2019). *Program Guidelines for Preventing Transmission of HIV, Syphilis and Hepatitis B from Mother to Child*. Jakarta: Directorate General of Public Health, Indonesian Ministry of Health.
- Karoud, W., Ghilissi, Z., Krichen, F., Kallel, R., Bougatef, H., Zarai, Z., Boudawara, T., Sahnoun, Z., Sila, A., & Bougatef, A. (2020). Oil from Hake (Merluccius merluccius): Characterization, Antioxidant Activity, Wound Healing and Anti-Inflammatory Effects. *Journal of Tissue Viability*, 29(2), 138–147. <https://doi.org/10.1016/j.jtv.2020.01.002>
- Kesty, C., & Bernolian, N. (2022). *Hepatitis B in Pregnancy*. Jakarta: Indonesian Ministry of Health. Retrieved from [https://yankes.kemkes.go.id/view\\_artikel/652/hepatitis-b-dalam-kehamilan](https://yankes.kemkes.go.id/view_artikel/652/hepatitis-b-dalam-kehamilan)
- Kurti, A. N., Redner, R., Bunn, J. Y., Tang, K., Nighbor, T., Lopez, A. A., Keith, D. R., Villanti, A. C., Stanton, C. A., Gaalema, D. E., Doogan, N. J., Cepeda-Benito, A., Roberts, M. E., Phillips, J., Parker, M. A., Quisenberry, A. J., & Higgins, S. T.

- (2018). Examining the Relationship between Pregnancy and Quitting Use of Tobacco Products in a U.S. National Sample of Women of Reproductive Age. *Preventive Medicine*, 117(August), 52–60. <https://doi.org/10.1016/j.ypmed.2018.08.019>
- Madi, J. M., Souza, R. D. S. D., Araújo, B. F. D., Filho, P. F. D. O., Rombaldi, R. L., Mitchell, C., Lorencetti, J., & Marcon, N. O. (2010). Prevalence of Toxoplasmosis, HIV, Syphilis and Rubella in a Population of Puerperal Women Using Whatman 903® Filter Paper. *Brazilian Journal of Infectious Diseases*, 14(1), 24–29. [https://doi.org/10.1016/s1413-8670\(10\)70006-4](https://doi.org/10.1016/s1413-8670(10)70006-4)
- Matthews, P. C., Ocama, P., Wang, S., El-Sayed, M., Turkova, A., Ford, D., Torimiro, J., Ferreira, A. C. G., Miranda, A. E., Restrepo, F. P. D. L. H., Seremba, E., Mbu, R., Pan, C. Q., Razavi, H., Dusheiko, G., Spearman, C. W., & Hamid, S. (2023). Enhancing Interventions for Prevention of Mother-to-Child- Transmission of Hepatitis B Virus. *JHEP Reports*, 5(8), 100777. <https://doi.org/10.1016/j.jhepr.2023.100777>
- Nawasari, P. (2023). *The Influence of Condom Use on Syphilis Incidence Rates Among Men Who Have Sex with Men (MSM) at Dr. RSUP. Sardjito, Yogyakarta 2017-2020* (Undergraduate Thesis). Gadjah Mada University. Retrieved from <https://etd.repository.ugm.ac.id/penelitian/detail/220713>
- Pham, T. D. H., Le, M. H., Pham, Q. D., Phung, K. L., Nguyen, M. N., Ha, T. B. N., Dao, B. K., Le, T. P., Nguyen, T. D., & Hoang, Q. C. (2024). Pregnant Women with Chronic Hepatitis B Virus Infection at the Assessment of Tenofovir Disoproxil Fumarate Prescription: Baseline Characteristics of a Prospective Cohort Study in Vietnam. *IJID Regions*, 11(May), 100375. <https://doi.org/10.1016/j.ijregi.2024.100375>
- Prawirohardjo, S. (2014). *Midwifery Science Sarwono Prawirohardjo*. Jakarta: PT. Bina Pustaka Sarwono Prawirohardjo.
- Rahayu, P., Marcelline, F., Sulistyaningrum, E., Suhartono, M. T., & Tjandrawinata, R. R. (2016). Potential Effect of Striatin (DLBS0333), a Bioactive Protein Fraction Isolated from *Channa striata* for Wound Treatment. *Asian Pacific Journal of Tropical Biomedicine*, 6(12), 1001–1007. <https://doi.org/10.1016/j.apjtb.2016.10.008>
- Roy, P., Chandan, C. S. S., Roy, N. C., & Islam, I. (2020). Feed Types Affect the Growth, Survival and Cannibalism in Early Juvenile of Striped Snakehead (*Channa striata* Bloch.). *Egyptian Journal of Aquatic Research*, 46(4), 377–382. <https://doi.org/10.1016/j.ejar.2020.08.009>
- Sanders, A. P., Svensson, K., Gennings, C., Burris, H. H., Oken, E., Amarasiriwardena, C., Basnet, P., Pizano-Zarate, M. L., Schnaas, L., Tamayo-Ortiz, M., Baccarelli, A. A., Satlin, L. M., Wright, R. O., & Tellez-Rojo, M. M. (2018). Prenatal Lead Exposure Modifies the Effect of Shorter Gestation on Increased Blood Pressure in Children. *Environment International*, 120(August), 464–471. <https://doi.org/10.1016/j.envint.2018.08.038>
- Stoltey, J. E., & Cohen, S. E. (2015). Syphilis Transmission: A Review of the Current Evidence. *Sexual Health*, 12(2), 103–109. <https://doi.org/10.1071/SH14174>
- Timmermans, K., Vaneker, M., Scheffer, G. J., Maassen, P., Janssen, S., Kox, M., & Pickkers, P. (2015). Soluble Urokinase-Type Plasminogen Activator Levels are Related to Plasma Cytokine Levels But Have Low Predictive Value for Mortality in Trauma Patients. *Journal of Critical Care*, 30(3), 476–480. <https://doi.org/10.1016/j.jcrc.2015.01.006>
- Widodo, E. (2009). Praktik Wanita Pekerja Seks (WPS) dalam Pencegahan Penyakit Infeksi Menular Seksual (IMS) dan HIV & AIDS di Lokalisasi Koplak, Kabupaten Grobogan. *Jurnal Promosi Kesehatan Indonesia*, 4(2), 94–102. <https://doi.org/10.14710/jpki.4.2.94-102>
- Xia, F. L. W., Supri, S., Djamaludin, H., Nurdiani, R., Seng, L. L., Yin, K. W., & Rovina, K. (2024). Turning Waste Into Value: Extraction and Effective Valorization Strategies of Seafood by-Products. *Waste Management Bulletin*, 2(3), 84–100. <https://doi.org/10.1016/j.wmb.2024.06.008>
- Yuan, X., Ma, X., Zhu, J., Yang, Y., Wang, Y., Xu, J., Dai, L., Li, H., Liu, Z., Dong, J., Wang, K., Li, X., & He, Y. (2024). Maternal Infection with Hepatitis B Virus Before Pregnancy and Risk of Congenital Malformations in Offspring: A Record-Linkage Study of a Large National Sample from China. *The Lancet Regional Health - Western Pacific*, 48, 1–11. <https://doi.org/10.1016/j.lanwpc.2024.101121>
- Zhang, J., Li, M., Zhang, G., Tian, Y., Kong, F., Xiong, S., Zhao, S., Jia, D., Manyande, A., & Du, H. (2021). Identification of Novel Antioxidant Peptides from Snakehead (*Channa argus*) Soup Generated During Gastrointestinal Digestion and Insights Into the Anti-Oxidation Mechanisms. *Food Chemistry*, 337(1), 127921. <https://doi.org/10.1016/j.foodchem.2020.127921>