e-ISSN: 2985-4415
DOI: 10.57254/irma.v4i2.96

International Research of Multidisciplinary Analysis
IRMA JOURNAL
Vol. 4, No. 2, February 2026 hal. 121-129
Journal Page is available at http://irma.nindikayla.com/index.php/home

Essential Neonatal Examinations and Early Breastfeeding Initiation as Indicators of the Quality of Midwifery Care in Indonesia

Yuliwati[1], Siti Nurbaiti[2]
[1]Universitas Salakanagara, Tangerang, Indonesia
[2]Universitas Bakti Asih Tangerang, Indonesia
Email: yuliwati@unsaka.ac.id

Abstract

Background. Most neonatal deaths occur during the first week of life and can be prevented through essential newborn care, early initiation of breastfeeding (EIB), and comprehensive neonatal visits (NV). These indicators reflect the quality of midwifery care, as midwives assist in the majority of deliveries in Indonesia.
Objectives. To describe the neonatal care cascade, the extent of care discontinuation, and trends in early breastfeeding initiation (EBI), low birth weight (LBW), and exclusive breastfeeding in Indonesia.
Methods. A descriptive-analytical study using cascade *analysis* of national estimates from the 2023 Indonesian Health Survey (SKI), the 2018 Riskesdas, and the 2007–2017 Indonesian Demographic and Health Survey (SDKI).
Results. In the 2023 SKI, 89.9% of deliveries took place at health facilities, and 87.6% of infants received KN1; however, coverage dropped to 67.9% for KN2 and 45.0% for KN3, with 40.5% receiving the full KN series. For every 100 infants who received KN1, only 51 received KN3. Coverage for congenital hypothyroidism screening was only 20.7%, low birth weight (LBW) was 6.1%, and 23.6% of LBW infants did not receive specialized care. IMD increased from 39.6% (2007) to 56.5% (2017).
Conclusion. The weakest points in neonatal care are the completeness of essential care at health facilities and the continuity of monitoring after the infant is discharged. Early breastfeeding initiation, SHK, and complete KN should be used as indicators of the quality of midwifery care.
Keywords: neonatal visits, early breastfeeding initiation, essential newborn care, quality of midwifery care, SKI 2023

Introduction

The neonatal period—the first 28 days of life—is the period with the highest risk of death throughout childhood. Globally, neonatal deaths account for nearly half of all under-five deaths, and the majority occur during the first week after birth (Lawn et al., 2014). In Indonesia, the 2017 Indonesia Demographic and Health Survey (SDKI) recorded a neonatal mortality rate of 15 per 1,000 live births (National Population and Family Planning Agency et al., 2018). Previous IDHS analyses have shown that neonatal mortality in Indonesia is associated with community factors, family socioeconomic status, and maternal health care during pregnancy and childbirth (Titaley et al., 2008).

e-ISSN: 2985-4415
DOI: 10.57254/irma.v4i2.96

Most neonatal deaths can be prevented through simple interventions provided at birth and during the first few days of life. The essential newborn care package includes maintaining body warmth, early breastfeeding initiation (EBI), umbilical cord care, eye ointment, vitamin K injection, hepatitis B immunization, and a newborn examination followed by a neonatal follow-up visit (Lawn et al., 2014; World Health Organization, 2022). In Indonesia, essential neonatal care is regulated by Ministry of Health Regulation No. 25 of 2014 on Child Health Services. Newborns must receive at least three neonatal visits (KN), namely KN1 within 6–48 hours, KN2 on days 3 through 7, and KN3 on days 8 through 28 (Ministry of Health of the Republic of Indonesia [Kemenkes RI], 2014a). Newborns must also undergo screening for congenital hypothyroidism (SHK) in accordance with Ministry of Health Regulation No. 78 of 2014 (Kemenkes RI, 2014b).

IMD—breastfeeding within the first hour after birth—is one of the interventions with the strongest evidence. A meta-analysis showed that infants who began breastfeeding 2–23 hours after birth had a 33% higher risk of neonatal death, and those who began breastfeeding after 24 hours had a 2.19-fold higher risk, compared to infants who were breastfed within the first hour (Smith et al., 2017). A cohort study in Ghana estimated that 22% of neonatal deaths could be prevented if all infants began breastfeeding within the first hour (Edmond et al., 2006). EIBF also increases the likelihood of successful exclusive breastfeeding: in Indonesia, working mothers who practice EIBF are twice as likely to exclusively breastfeed (Syahri et al., 2024).

Nevertheless, the practice of IMD in Indonesia is not yet optimal. The proportion of IMD increased from 49.9% in the 2012 SDKI to 56.5% in the 2017 SDKI, meaning that nearly half of all infants are still breastfed too late (Nurokhmah et al., 2023). Skin-to-skin contact, vaginal delivery, and a trained birth attendant are associated with IMD, whereas cesarean section reduces the likelihood of IMD by half (Gayatri & Dasvarma, 2020). On the other hand, utilization of postnatal care services remains low. Infants from poor families, those with mothers who have low levels of education, those living in rural areas, and those born outside of health facilities are less likely to receive postnatal care (Titaley et al., 2009).

Midwives constitute the largest group of birth attendants and are the primary providers of neonatal care in Indonesia (Adnani et al., 2025). Therefore, IMD and the completeness of neonatal visits can be viewed as process indicators of the quality of midwifery care, demonstrating whether midwives are not only present during childbirth but also provide essential care and follow-up monitoring. The midwifery care quality framework emphasizes that quality is measured not only by coverage but also by the completeness and continuity of care (Renfrew et al., 2014).

Key findings from the 2023 Indonesia Health Survey (SKI) now enable an updated assessment of these indicators. This study aims to: (1) describe the continuum of neonatal care from delivery at health facilities to complete neonatal care based on the 2023 SKI; (2) calculate the extent of service discontinuity at each stage; (3) describe trends in immediate skin-to-skin contact (IMD), low birth weight (LBW), and exclusive breastfeeding from the national survey; and (4) discuss the implications for the quality of midwifery care.

e-ISSN: 2985-4415
DOI: 10.57254/irma.v4i2.96

Methods

Study Design. This is a descriptive-analytical study using aggregated secondary data from a national household survey. The analysis employed a *cascade analysis* approach, which tracks the proportion of infants who continued to receive care at each stage, from delivery through the final neonatal visit.

Data Sources. All data are published national estimates accessed in October 2026:

Table 1. Research Data Sources

Source	Data Year	Data Used	Reference Population
Key Findings of the 2023 SKI (Health Development Policy Agency, 2024)	2023	Complete KN, LBW, national and provincial highest/lowest rates of exclusive breastfeeding, deliveries attended by health workers and at health facilities, postpartum care	Children 0–59 months; infants 0–5 months; women 10–54 years
SKI 2023 Maternal Health Fact Sheet (Health Development Policy Agency, n.d.)	2023	MTR1, MTR2, MTR3, SHK, LBW without special care	Children 0–59 months
Riskesdas 2018 (Indonesian Ministry of Health, 2019)	2018	Low Birth Weight	Children 0–59 months
SDKI 2007, 2012, and 2017 (Nurokhmah et al., 2023; Gayatri & Dasvarma, 2020)	2007–2017	Proportion of IMDS	Live births in the past 2 years

Operational definition.

Table 2. Operational definitions of variables

Variable	Definition	Scale
KN1, KN2, KN3	Percentage of infants receiving neonatal visits within 6–48 hours (KN1), on days 3 through 7 (KN2), and on days 8 through 28 (KN3)	Ratio (%)
Complete KN	Percentage of children who received all three scheduled neonatal visits	Ratio (%)
IMD	Percentage of infants who begin breastfeeding within the first hour after birth	Ratio (%)
SHK	Percentage of infants screened for congenital hypothyroidism	Ratio (%)
LBW	Percentage of children with a birth weight of less than 2,500 grams according to documentation (Maternal and Child Health Book or health records) or the respondent's recollection	Ratio (%)
Exclusive breastfeeding	Percentage of infants aged 0–5 months who were exclusively breastfed in the past 24	Ratio (%)

e-ISSN: 2985-4415
DOI: 10.57254/irma.v4i2.96

Variable	Definition	Scale
	hours	
Inter-stage service discontinuation	Difference in proportion between two consecutive service stages	Percentage points
Conditional retention	Proportion of the final stage divided by the first stage (e.g., KN3/KN1), as an estimate of infants who remain in the service chain	Ratio (%)

Data analysis. Data were analyzed descriptively using Python 3. For each stage of the care continuum, the following were calculated: (1) coverage proportion, (2) absolute decrease compared to the previous stage, and (3) conditional retention relative to KN1. Trends in IMD and LBW are presented as absolute changes between surveys. Since the available data consist of aggregated national estimates without standard errors, inferential statistical tests were not performed, and comparisons between surveys were interpreted while taking into account differences in reference populations and definitions.

Research ethics. This study used publicly available aggregate data without individual identifiers; therefore, no ethical approval was required. If the target journal requires it, researchers may submit a request for *an ethical exemption* to their institution's ethics committee.

Results

The largest drop in service coverage occurred after the infants were discharged. In the 2023 SKI, 96.1% of births were attended by health workers and 89.9% took place in health facilities. Nearly all infants born with the assistance of health workers received KN1 (87.6%), but coverage dropped sharply for KN2 (67.9%) and KN3 (45.0%).

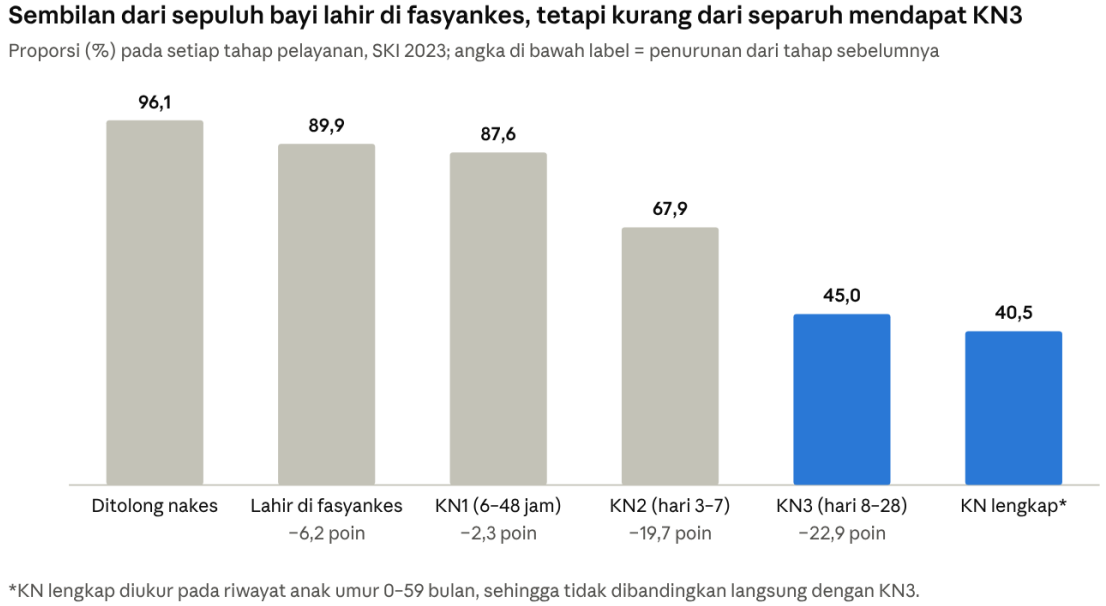


Figure 1. Nine out of ten infants are born in health facilities, but fewer than half receive KN3. Source: Key findings of the 2023 SKI and the 2023 SKI maternal health fact sheet (Health Development Policy Agency, Indonesian Ministry of Health) · national estimates

The drop from births at health facilities to KN1 was only 2.3 percentage points, while the drop from KN1 to KN2 reached 19.7 points and from KN2 to KN3, 22.9 points. In other words, out of every 100 infants who received KN1, only about 78 returned for KN2 and 51 received KN3. The proportion of children aged 0–59 months with a complete KN history is 40.5%.

Essential newborn care services remain unevenly distributed. Only 20.7% of infants received screening for congenital hypothyroidism (SHK), even though nearly 90% of infants were born in health facilities.

Table 3. Essential neonatal care indicators and newborn outcomes from the national survey

Indicator	2018 Riskesdas	SKI 2023
KN1 (%)		87.6
KN2 (%)		67.9
KN3 (%)		45.0
Complete KN, children 0–59 months (%)		40.5
SHK (%)		20.7
Low Birth Weight (%)	6.2	6.1 (documented); 6.2 (documented or recalled)
Low Birth Weight without Special Care (%)		23.6
Exclusive breastfeeding, infants 0–5 months (%)		68.6
Comprehensive postpartum care, mothers (%)		26.8

Source: Indonesian Ministry of Health (2019); Health Development Policy Agency (2024, n.d.). Blank cells indicate that the indicator is not available in accessible publications.

The proportion of **low birth weight (LBW) infants has remained stable, but nearly a quarter do not receive specialized care.** The proportion of LBW infants did not change between the 2018 Riskesdas (6.2%) and the 2023 SKI (6.1–6.2%). However, 23.6% of LBW infants do not receive specialized care.

IMD has increased slowly and still does not reach two-thirds of infants. SDKI data show an increase in IMD from approximately 39.6% in 2007 to 49.9% in 2012 and 56.5% in 2017 (Nurokhmah et al., 2023). This 16.9-point increase over the past ten years has coincided with a rise in the number of births at health facilities, but nearly half of all infants are still not breastfed within the first hour.

Exclusive breastfeeding varies across provinces. Nationally, exclusive breastfeeding among infants aged 0–5 months reached 68.6%. The highest rates were recorded in West Nusa Tenggara (87.9%), Jambi (81.3%), and East Nusa Tenggara (79.7%), while the lowest were in Gorontalo (47.4%), Southwest Papua (47.7%), and North Sulawesi (52.0%) (Health Development Policy Agency, 2024).

Postpartum care for mothers is lower than that for infants. The rate of comprehensive postnatal care for infants (40.5%) is higher than that for mothers

e-ISSN: 2985-4415
DOI: 10.57254/irma.v4i2.96

(26.8%), even though both visits should ideally be conducted simultaneously by the same midwife.

Discussion

Midwives are present at birth, but follow-up after discharge remains weak. KN1 coverage (87.6%) is nearly the same as for births at health facilities (89.9%), indicating that the first checkup is generally provided before the infant is discharged. The main issue arises afterward: coverage drops by nearly 20 percentage points for KN2 and another 23 percentage points for KN3. This pattern of decline throughout the care continuum aligns with findings in 35 low- and middle-income countries, where service utilization decreases from the antenatal to the postpartum period (Baten et al., 2025). In fact, the majority of neonatal deaths occur during the first week of life (Lawn et al., 2014), making KN2—on days 3 through 7—a critical contact for detecting jaundice, umbilical cord infection, sepsis, and breastfeeding problems.

Barriers to follow-up visits are economic, geographic, and sociocultural. A study in West Java found that costs, transportation, distance, and the frequent absence of village midwives hinder postpartum visits, as does the perception that care is needed only when the baby is sick (Titaley et al., 2010). In Klaten, low family health literacy, intergenerational norms, and the workload of village midwives limit postpartum care (Probandari et al., 2017). Infants from poor families and those born outside of health facilities are also less likely to receive postnatal care (Titaley et al., 2009). Therefore, the schedule for the second and third postnatal visits (KN2 and KN3) should be agreed upon with the family before the infant is discharged, and home visits by midwives should be a regular part of care, especially for families living far from health facilities.

Maternal and infant care should be integrated. The rate of comprehensive postnatal care for infants (40.5%) is higher than that for mothers (26.8%). The WHO recommends that postpartum care for mothers and infants be provided simultaneously, so that a single visit can assess the mother's health, the infant's health, and breastfeeding practices all at once (World Health Organization, 2022). The schedules for KF and KN in Indonesia largely overlap, so combining them into a single visit with a midwife can improve the comprehensiveness of care for mothers and infants.

IMD as an indicator of the quality of childbirth care. Although it has increased from 39.6% to 56.5% over the past ten years, nearly half of all infants in Indonesia are not breastfed within the first hour (Nurokhmah et al., 2023). Skin-to-skin contact increases the likelihood of IMD by 2.6 times, whereas cesarean section reduces the likelihood by half (Gayatri & Dasvarma, 2020). Both of these factors are within the control of birth attendants. Because delayed breastfeeding is associated with a higher risk of neonatal mortality (Edmond et al., 2006; Smith et al., 2017), IMD should be adopted as a process quality indicator for midwifery care in every health facility and midwife's private practice. IMD also serves as a gateway to the success of exclusive breastfeeding (Syahri et al., 2024); thus, the variation in exclusive breastfeeding rates across provinces—ranging from 47.4% in Gorontalo to 87.9% in NTB—likely partly reflects differences in IMD practices and breastfeeding support starting from the first day.

Newborn **screening (SHK) and care for low birth weight (LBW)** infants **reveal gaps in essential care.** The SHK coverage of only 20.7%—despite nearly 90% of infants being born in health facilities—indicates that opportunities for screening before

discharge have not been fully utilized. The requirement for SHK has been in place since 2014 (Indonesian Ministry of Health, 2014b); thus, the low coverage is likely related to the availability of screening paper, the transport of samples to referral laboratories, infants being discharged earlier than the scheduled sample collection time, as well as the understanding of healthcare workers and families. Furthermore, 23.6% of low birth weight (LBW) infants did not receive specialized care. LBW is one of the leading causes of neonatal mortality (Lawn et al., 2014); therefore, identifying LBW at birth, monitoring body temperature, supporting breastfeeding, providing kangaroo care, and ensuring appropriate referrals must become standard components of midwifery care.

Implications for the quality of midwifery care. The framework for quality midwifery care emphasizes that high-quality care not only reaches mothers and infants but is also comprehensive, timely, and continuous (Renfrew et al., 2014). The results of this study indicate that the weakest link in neonatal care in Indonesia is not access during childbirth, but rather the comprehensiveness of essential care at health facilities (IMD and SHK) and continuity of care after the infant is discharged (KN2 and KN3). Since midwives assist in the majority of deliveries (Adnani et al., 2025), strengthening midwives' competencies and work systems at these critical points will have a broad impact.

Limitations. First, the analyzed data consist of aggregate national estimates without standard errors, so neither inferential statistical tests nor province-level analyses could be conducted. Second, the 2023 SKI data on IMD and provincial-level details on KN are not yet accessible; therefore, trends in IMD were analyzed using 2007–2017 SDKI data. Third, the KN indicators for childbirth and the postpartum period are measured in different reference populations; thus, the stages of the care continuum do not fully represent the same cohort of infants. Fourth, survey data rely on documents and respondents' memories, which can introduce recall bias, especially for visits that occurred several years prior to the survey. Fifth, other essential care components such as vitamin K injections, eye ointment, and hepatitis B immunization have not yet been analyzed.

Conclusions and Recommendations

The 2023 SKI survey shows that nearly all infants were born with the assistance of a health worker and received KN1 (87.6%), but only 67.9% received KN2, 45.0% received KN3, and 20.7% received SHK. IMD increased to 56.5% in the 2017 SDKI, but nearly half of the infants were still breastfed late, and 23.6% of low birth weight (LBW) infants did not receive specialized care. The weakest points in neonatal care are the completeness of essential care at health facilities and the continuity of monitoring after the infant is discharged. IMD, SHK, and complete KN should be used as indicators of the quality of midwifery care.

Recommendations:

- **For midwives:** perform skin-to-skin contact and immediate breastfeeding (IMD) during every normal delivery; support immediate breastfeeding after cesarean section if the mother's and infant's conditions permit; and agree on a schedule for the second and third follow-up visits (KN2 and KN3) with the family before the infant is discharged.
- **For healthcare facilities and community health centers:** ensure that SHK samples are collected before the infant is discharged or during a home visit;

e-ISSN: 2985-4415
DOI: 10.57254/irma.v4i2.96

combine postpartum and neonatal visits; and provide specialized care for low birth weight (LBW) infants.

- **For health departments and the Ministry of Health:** establish immediate breastfeeding (IMD), SHK, and complete follow-up visits as quality indicators that are routinely monitored and publish data by province openly.
- **For researchers:** analyze individual 2023 SKI data to assess the determinants of IMD and complete KN, as well as their relationship with neonatal mortality by province.

References

Adnani, Q. E. S., Maulina, R., Ramadhan, K., Argaheni, N. B., Kennedy, H. P., & Telfer, M. (2025). Trends and determinants of antenatal, intranatal, and postnatal care utilization among Indonesian women (2012–2017): Associated factors in midwifery service utilization between midwives and other health professionals. *BMC Nursing, 24*(1), Article 912. https://doi.org/10.1186/s12912-025-03527-6

Health Development Policy Agency. (2024). *Key Findings of the 2023 SKI*. Ministry of Health of the Republic of Indonesia. https://www.badankebijakan.kemkes.go.id/daftar-frequently-asked-question-seputar-hasil-utama-ski-2023/hasil-utama-ski-2023/

Health Development Policy Agency. (n.d.). *Maternal Health Factsheet: 2023 Indonesia Health Survey* [Factsheet]. Ministry of Health of the Republic of Indonesia. https://repository.badankebijakan.kemkes.go.id/5525/1/01%20factsheet%20Kesehatan%20Ibu_bahasa.pdf

National Population and Family Planning Agency, Central Statistics Agency, Ministry of Health, & ICF. (2018). *2017 Indonesia Demographic and Health Survey*. BKKBN. https://www.dhsprogram.com/pubs/pdf/FR342/FR342.pdf

Baten, A., Biswas, R. K., Kendal, E., & Bhowmik, J. (2025). Continuum of maternal healthcare services utilization in low- and middle-income countries: A multi-level analysis. *Midwifery, 149*, Article 104549. https://doi.org/10.1016/j.midw.2025.104549

Edmond, K. M., Zandoh, C., Quigley, M. A., Amenga-Etego, S., Owusu-Agyei, S., & Kirkwood, B. R. (2006). Delayed breastfeeding initiation increases the risk of neonatal mortality. *Pediatrics, 117*(3), e380–e386. https://doi.org/10.1542/peds.2005-1496

Gayatri, M., & Dasvarma, G. L. (2020). Predictors of early initiation of breastfeeding in Indonesia: A population-based cross-sectional survey. *PLOS ONE, 15*(9), Article e0239446. https://doi.org/10.1371/journal.pone.0239446

Ministry of Health of the Republic of Indonesia. (2014a). *Minister of Health Regulation No. 25 of 2014 on Child Health Efforts*. Ministry of Health of the Republic of Indonesia.

Ministry of Health of the Republic of Indonesia. (2014b). *Minister of Health Regulation No. 78 of 2014 on Screening for Congenital Hypothyroidism*. Ministry of Health of the Republic of Indonesia.

Ministry of Health of the Republic of Indonesia. (2019). *2018 Riskesdas National Report*. Agency for Health Research and Development. https://www.kemkes.go.id/id/potret-sehat-indonesia-riskesdas-2018

Lawn, J. E., Blencowe, H., Oza, S., You, D., Lee, A. C. C., Waiswa, P., Lalli, M., Bhutta, Z., Barros, A. J. D., Christian, P., Mathers, C., & Cousens, S. N. (2014). Every Newborn: Progress, Priorities, and Potential Beyond Survival. *The Lancet, 384*(9938), 189–205. https://doi.org/10.1016/S0140-6736(14)60496-7

Nurokhmah, S., Middleton, L., Februhartanty, J., & Hendarto, A. (2023). Trends and determinants of early initiation of breastfeeding in Indonesia: A multivariate decomposition analysis. *PLOS ONE, 18*(11), Article e0294900. https://doi.org/10.1371/journal.pone.0294900

Probandari, A., Arcita, A., Kothijah, K., & Pamungkasari, E. P. (2017). Barriers to the utilization of postnatal care at the village level in Klaten District, Central Java Province, Indonesia. *BMC Health Services Research, 17*(1), Article 541. https://doi.org/10.1186/s12913-017-2490-y

Renfrew, M. J., McFadden, A., Bastos, M. H., Campbell, J., Channon, A. A., Cheung, N. F., Silva, D. R. A. D., Downe, S., Kennedy, H. P., Malata, A., McCormick, F., Wick, L., & Declercq, E. (2014). Midwifery and quality care: Findings from a new evidence-informed framework for maternal and newborn care. *The Lancet, 384*(9948), 1129–1145. https://doi.org/10.1016/S0140-6736(14)60789-3

Smith, E. R., Hurt, L., Chowdhury, R., Sinha, B., Fawzi, W., Edmond, K. M., & Neovita Study Group. (2017). Delayed breastfeeding initiation and infant survival: A systematic review and meta-analysis. *PLOS ONE, 12*(7), Article e0180722. https://doi.org/10.1371/journal.pone.0180722

Syahri, I. M., Laksono, A. D., Fitria, M., Rohmah, N., Masruroh, M., & Ipa, M. (2024). Exclusive breastfeeding among Indonesian working mothers: Does early initiation of breastfeeding matter? *BMC Public Health, 24*(1), Article 1225. https://doi.org/10.1186/s12889-024-18619-2

Titaley, C. R., Dibley, M. J., Agho, K., Roberts, C. L., & Hall, J. (2008). Determinants of neonatal mortality in Indonesia. *BMC Public Health, 8*(1), Article 232. https://doi.org/10.1186/1471-2458-8-232

Titaley, C. R., Dibley, M. J., & Roberts, C. L. (2009). Factors associated with non-utilization of postnatal care services in Indonesia. *Journal of Epidemiology and Community Health, 63*(10), 827–831. https://doi.org/10.1136/jech.2008.081604

Titaley, C. R., Hunter, C. L., Heywood, P., & Dibley, M. J. (2010). Why don't some women attend antenatal and postnatal care services?: A qualitative study of community members' perspectives in Garut, Sukabumi, and Ciamis districts of West Java Province, Indonesia. *BMC Pregnancy and Childbirth, 10*(1), Article 61. https://doi.org/10.1186/1471-2393-10-61

World Health Organization. (2022). *WHO recommendations on maternal and newborn care for a positive postnatal experience*. World Health Organization. https://www.who.int/publications/i/item/9789240045989