May 2021

An Evidence Brief for Policy

Executive Summary

Reducing Neonatal Mortality in Ethiopia: A Call for Urgent Action!

Included:

- *Description of a problem*
- *Viable options for addressing this problem*
- *Strategies for implementing the options*

Not included: recommendations

This policy brief does not make recommendations regarding which policy option to choose

Who is this evidence brief for?

Policymakers, their support staff, and other stakeholders with an interest in the problem addressed by this evidence brief

Why was it prepared?

To inform deliberations about health policies and programs by summarizing the best available evidence about the problem and viable solutions

What is an evidence brief for policy?

Evidence brief for policy brings together **global research evidence** (from systematic reviews*) and **local evidence** to inform deliberations about health policies and programs

***Systematic Review:** A summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise the relevant research, and to collect and analyze data from this research

Full Report

The evidence summarized in this Executive Summary is described in more detail in the Full Report

This evidence brief for policy was prepared by the Knowledge Translation Directorate of the Ethiopian Public Health Institute.

Key messages

The problem: Persistently High Neonatal Mortality in Ethiopia

Neonatal mortality is a core indicator of neonatal health defined as death during the first 28 days of life. Ethiopia is one of the top five countries where almost half of all the global neonatal mortality occurred. While the world has targeted to reduce neonatal mortality to at least 12 per 1,000 live births by 2030, Ethiopia is still recording persistently high neonatal mortality. The current level of neonatal death (33 deaths per 1, 000 live births) reflects that Ethiopia is far behind the goal set at the national level which was reducing neonatal mortality to 10 per 1, 000 live births by 2020. The possibility of achieving the global commitment, sustainable development goals (SDGs), of reducing neonatal mortality to 12 deaths per 1,000 live births by 2030 is also uncertain.

The causes of neonatal mortality are multifactorial and can be classified as:

- **Immediate causes** (maternal/obstetrics risks and complications, neonatal infections and conditions, problem with early initiation of breastfeeding/inadequate exclusive breastfeeding, and congenital abnormalities)
- **Underlying factors** (Three delays: first delay, second delay and third delay; poor water/sanitation and hygiene, and inadequate basic healthcare services; and inadequate maternal nutritional intake)
- **Basic factors** at societal level

Policy options/interventions:

The evidence brief looked at different options or interventions on neonatal mortality reduction across the life course. Accordingly, **effective** and **promising** interventions are identified. The effective interventions include antenatal corticosteroids for preventing neonatal respiratory distress syndrome in preterm infants, early initiation of breastfeeding, hygienic cord care, and kangaroo care for preterm newborns. To successfully implement the above effective and promising interventions, different arrangement mechanisms such as delivery, governance and financial arrangements should be considered. Considering these arrangements, we have identified the following approaches

Community-based intervention packages

- *Intervention packages consisting of mainly building community-support groups or women's groups **probably decrease** neonatal mortality by 16%*
- *Intervention packages consisting of mainly building community-support groups or women's groups **probably decrease** neonatal mortality by 40%*
- *Community mobilization and home-based neonatal treatment **probably reduce** neonatal mortality.*

Strengthening continuum of care

- *Interventions linking pre-pregnancy and pregnancy care **probably reduce** neonatal mortality by 21%.*

Implementation strategies:

Strategies for implementing the interventions and approaches should take advantage of factors that enable their implementation as well as addressing barriers.

The problem: *Persistently high Neonatal Mortality in Ethiopia*

Neonatal mortality is a core indicator of neonatal health defined as death during the first 28 days of life (WHO, 2015). About half of under-five mortality (2.4 million deaths) in 2019 occurred within the neonatal period (UNICEF, 2020). Almost all neonatal deaths (98%) occur in low- and middle-income countries, with 78% in Southern Asia and Sub-Saharan Africa. Ethiopia is among the 10 countries with the highest neonatal mortality (WHO, 2018).

While the world has targeted to reduce neonatal mortality to at least 12 per 1,000 live births in 2030, neonatal mortality in Ethiopia is unacceptably high (EPHI & ICF, 2019). The current level of neonatal death reflects that Ethiopia is far behind the goal set by the National Health Sector Transformation Plan (HSTP) which was 10 deaths per 1,000 live births by 2020 (FMoH, 2015a). The possibility of achieving the global commitment, sustainable development goals (SDGs), of reducing neonatal mortality to 12 deaths per 1,000 live births by 2030 is also uncertain (FMoH, 2015a; UN, 2015).

The objective of preparing this evidence brief for policy is, therefore, to summarize the best available evidence describing the problem in Ethiopia and potential solutions for addressing the problem.

Size of the Problem

The current neonatal mortality rate (33 deaths per 1, 000 live births) reflects a worsening situation of the problem in Ethiopia compared to the DHS 2016 report (29 deaths per 1, 000 live births) (EPHI & ICF, 2019; FMoH, 2020). The contribution of neonatal mortality to the overall under-five mortality and Infant mortality is also significant and persistently increased (EPHI & ICF, 2019).

Cause of the problem

The UNICEF conceptual framework for maternal and neonatal mortality and morbidity (UNICEF, 2009) was adapted for this evidence brief to appropriately frame the causes section. Accordingly, the causes are classified as immediate, underlying, and basic causes.

1. Immediate causes

1.1. Maternal/obstetric risks and complications: Maternal risks and complications like high-risk mothers, maternal infections, teenage pregnancy, inadequate ANC visits, and short birth spacing have been identified as contributing factors for neonatal death globally (UNICEF, 2009). Pocket studies conducted in Ethiopia also support this fact (Seid *et al.*, 2019; Tolossa *et al.*, 2020).

1.2. Neonatal infections and conditions: The large majority (80%) of newborn deaths are related to the three preventable and treatable conditions: preterm birth, Intrapartum related events (including birth asphyxia), and infection (WHO & UNICEF, 2020). The proportion of causes of neonatal deaths in Ethiopia due to preterm birth, birth asphyxia, and infection is estimated to be 35%, 24%, and 23% respectively (Liu et al., 2016).

1.3. Problem with early initiation of breastfeeding: Neonates who initiated breastfeeding after the first hour and through the remainder of the first day of life had about 41% greater risk of death (Oot *et al.*, 2018). Studies in Ethiopia also showed that the lack of early initiation of breastfeeding within the first one hour of birth is a predictor of neonatal mortality (Desalew *et al.*, 2020).

1.4. Congenital Abnormalities: In Ethiopia, the proportionate contribution of congenital abnormalities to neonatal death is also estimated to be 11% (HNN, 2017). The 2020 annual performance report of the Federal Ministry of Health of Ethiopia also indicated the increasing trend in the incidence of congenital anomalies such as neural tube defects (FMoH, 2020).

2. Underlying factors at the household/community: Multiple underlying factors contribute to neonatal mortality. The underlying factors at the household or community level in this document were framed as the "three delays", poor Water, Sanitation and Hygiene (WASH), and inadequate maternal dietary intake/early and exclusive breastfeeding (UNICEF, 2009).

2.1. First delay: The first delay indicates the delay in the decision to seek both preventive and curative health services primarily due to a lack of education and health information (Thaddeus and Maine, 1994). Socioeconomic, cultural and religious factors could also affect the women, family, and community's decision to seek healthcare (UNICEF, 2009). The findings from DHS and other pocket studies in Ethiopia indicate that neonates are at greater risk of dying if they are born to women with no education and households headed with illiterates (CSA, 2016; Wolde et al., 2019).

2.2. Second Delay The second delay describes the situation when reaching healthcare services is delayed. Geographical barriers, poor and unpaved roads, unavailability of public transport, lack of newborn friendly ambulance services, lack of appropriate communication modes in referral linkages, and distance to the health facilities are delay factors thus inhibit the access to maternal and neonatal care services (Thaddeus and Maine, 1994). Pocket studies that were done throughout Ethiopia also support that the mentioned delay factors were found to be predictors of neonatal mortality in Ethiopia (Orsido et al., 2019; Seid *et al.*, 2019).

2.3. Third delay: The third delay occurs due to poor quality of care i.e., the delay in the provision of healthcare services at health facilities caused by shortages of staff, staff competency, availability of equipment & supplies, and inadequate management (Thaddeus and Maine, 1994). According to the EmONC survey, unavailability of adequate trained staff, shortage of equipment, drugs and supplies, facility readiness, and management were mentioned gaps in the Ethiopian health sector which might be the indirect contributors to neonatal death by resulting in the third delay (EPHI, 2018).

2.4. Poor water/sanitation and hygiene, and inadequate basic healthcare services: Infections due to lack of access to clean water and unhygienic practices especially during delivery accounts for a substantial proportion (around a quarter) of neonatal deaths (UNICEF, 2009; Karumbi *et al.*, 2013). Further analysis of Ethiopian DHS (2016) has indicated that no latrine facility and unprotected water sources were associated with a higher risk of neonatal mortality (Fenta, Biresaw and Fentaw, 2021).

3. Basic factors at a societal level

The underlying factors of neonatal mortality are influenced by some basic interrelated factors such as political, economic, cultural, religious, and social systems, including women's status that limits the utilization of potential resources (environment, technology and people). Besides, inadequate and/or inappropriate knowledge and discriminating attitudes could limit household access to actual resources (UNICEF, 2009).

Policy options

Eighty percent of the causes for all neonatal deaths are preventable and treatable if high coverage of effective interventions is achieved (UNICEF, 2020). Despite the efforts and implementation of various interventions by the government of Ethiopia, the desired impact did not transpire in reducing neonatal mortality. Therefore, this evidence brief looked at the effect of different interventions on neonatal mortality across the life course (Lassi et al., 2015). Accordingly, the interventions are classified as effective, promising and ineffective. See the details of the interventions and their impact on neonatal mortality in table 1 below.

Table 1: Impact of interventions on neonatal mortality (across the life course)

Intervention	Impact on Neonatal Mortality (NM)	Effectiveness
Pre-pregnancy interventions		
– Family planning, Folic acid supplementation		Ineffective
Pregnancy interventions		
– Antenatal care (ANC)	⦿ ***Reduced number of ANC visits was associated with 14% higher risk of perinatal mortality***	Promising
– Tetanus immunization in pregnancy	⦿ ***There is a significant impact of TT immunization on reducing NM***	Promising
– Antenatal corticosteroids for prevention of neonatal respiratory distress syndrome	⦿ ***Reduces neonatal deaths by 31%***	Effective
– Iron and folic acid supplementation, calcium supplementation, prophylactic antimalarial, promotion and provision of ITNs, smoking cessation, prevention and treatment of eclampsia, external cephalic version, induction of labor for PROM & antibiotics for PROM		Ineffective
Childbirth interventions		
– Induction of labor for prolonged pregnancy	⦿ ***69% reduction in perinatal mortality with induced labor at term or post-term***	Promising
– Active management of the third stage of labor		Ineffective
Newborn intervention		
– Early initiation of breastfeeding	⦿ ***Reduces neonatal deaths by 44%***	Effective
– Hygienic cord care (including chlorhexidine cord cleansing)	⦿ ***Reduces neonatal deaths by 23%***	Effective
– Kangaroo mother care (KMC) for preterm	⦿ ***Reduces neonatal deaths by 51%***	Effective
– Case management of neonatal sepsis, meningitis and pneumonia	⦿ ***27% reduction in all-cause NM***	Promising
– Prophylactic and therapeutic use of surfactant	⦿ ***16% reduction in neonatal mortality***	Promising
– Continuous positive airway pressure (CPAP) for neonatal resuscitation	⦿ ***48% reduction in neonatal mortality***	Promising
– Thermal care for all newborns, neonatal resuscitation with bag and mask, presumptive antibiotic therapy		Ineffective
– Home visits across the continuum of care	⦿ ***38% reduction in neonatal mortality***	Promising

N.B:

- ⦿ **Effective interventions:** indicating that the review found high-quality evidence with the effect likely to be similar to research findings
- ⦿ **Promising interventions** (more evidence needed): indicating that the review found moderate-quality evidence with the effect expected to be similar to research findings, but with a possibility that it will be substantially different in the future
- ⦿ **Ineffective interventions: I**ndicating that the review found low or very low-quality evidence of effectiveness or lack of effectiveness for an intervention

To successfully implement the above effective and promising interventions, different arrangement mechanisms such as delivery, governance and financial arrangements should be considered. Considering these arrangements, we have identified the following approaches.

1: Community-based interventions

A significant proportion of neonatal deaths could potentially be addressed by community-based intervention packages, which are defined as delivering more than one intervention via different sets of strategies. The different community-based interventions are discussed below.

A) Intervention packages consisting mainly of building community support or women's groups

These interventions consisted of monthly meetings of mothers' groups to identify maternal and neonatal health problems, prioritization of problems and implementation and monitoring strategies with participatory learning cycle (Zamorano and Herrera, 2017).

Impact: A SUPPORT summary (Zamorano & Herrera, 2017) of a systematic review (Lassi & Bhutta, 2015) evaluated the impact of intervention packages consisting of building community-support or women's groups in reducing neonatal mortality. The systematic review based on studies from communities in LMIC found that:

- ***Intervention packages consisting of mainly building community-support groups or women's groups probably decrease neonatal mortality (by 16%)***

B) Intervention packages consisting mainly of community mobilization and antenatal and postnatal home visitation

These interventions included home visits and promotion of antenatal care, iron and folate use during pregnancy, immediate newborn care including early initiation of breastfeeding, promotion of exclusive breastfeeding, promotion of maternal nutrition and rest, recognition of danger signs and lay health workers (community health workers such as health extension workers in the Ethiopian context) visits to pregnant women during pregnancy and in the postnatal month.

Impact: A SUPPORT summary (Zamorano & Herrera, 2017) of a systematic review (Lassi & Bhutta, 2015) evaluated the impact of intervention packages consisting mainly of community mobilization, antenatal and postnatal home visitation in reducing neonatal mortality. The systematic review based on studies from communities in LMIC found that:

- ***Intervention packages consisting mainly of community mobilization and antenatal and postnatal home visitation decreases neonatal mortality (by 40%)***

C) Other community-based intervention packages

Other community-based intervention packages include home-based neonatal care and treatment, education of mothers and antenatal and postnatal visitation and community mobilization and home-based neonatal treatment.

Impact: A SUPPORT summary (Zamorano & Herrera, 2017) of a systematic review (Lassi & Bhutta, 2015) evaluated the impact of other community-based intervention packages in reducing neonatal mortality. The systematic review based on studies from communities in LMIC found that:

- ***Home-based neonatal care and treatment/community case management may decrease neonatal mortality***
- ***Education of mothers and antenatal and postnatal visitation may decrease neonatal mortality***
- ***Community mobilization and home-based neonatal treatment probably reduce neonatal mortality***

2: Strengthening continuum of care

The continuum of care is a series of care strategies starting from pre-pregnancy to motherhood-childhood to avoid preventable diseases (Johnson et al., 2006; Kikuchi et al., 2016; PMNCH, 2010).

Impact: A systematic review (Kikuchi et al., 2016) assessed the effectiveness of the continuum of care (linking pre-pregnancy to motherhood-childhood care) compared to the standard care provided in health facilities in improving neonatal mortality. The systematic review, based on studies from communities in LMIC found that:

- ***Interventions linking pre-pregnancy and pregnancy care probably reduce neonatal mortality (by 21%)***

If a substantial reduction in neonatal mortality is desired, both, community and facility-based interventions are required, linked by functioning referral systems, giving the potential to prevent avoidable newborn deaths every year (Zaidi et al., 2011). However, ensuring access to healthcare by pregnant women is a challenge in low- and middle-income countries. Even if access is possible, a lack of adequate personnel or equipment may mean that complications cannot be treated when they arise. Thus, emergency referral interventions have been advocated to reduce both maternal and neonatal mortality.

Interventions to improve referrals are usually complex but can generally be addressed through organizational interventions (those involved, for example, in overcoming obstacles to emergency transport, particularly cost) and structural interventions (the purchasing of equipment, such as motorcycles/ambulances or communication equipment, or the building, for instance, of maternity homes) (Karumbi, 2016). The impacts of organizational and structural interventions are shown below.

Impact of Organizational Interventions: A SUPPORT summary (Karumbi, 2016) of a systematic review (Hussein et al., 2012) evaluated the effectiveness of emergency obstetric referral interventions in reducing maternal and neonatal mortalities. The systematic review based on studies from rural areas in low-income countries found that:

- ***Organizational interventions probably reduce neonatal deaths (by 52%)***

Impact of structural Interventions: A SUPPORT summary (Karumbi, 2016) of a systematic review (Hussein et al., 2012) evaluated the effectiveness of emergency obstetric referral interventions in reducing maternal and neonatal mortalities. The systematic review based on studies from rural areas in low-income countries found that:

- ***Structural interventions may reduce neonatal deaths.***

Implementation considerations

Strategies for implementing the interventions and approaches should take advantage of factors that enable their implementation as well as addressing barriers. For more details refer to the Full Report.

References

Ahmed, A., Zahidie, A. and Rabbani, F. (2013) 'Interventions to reduce neonatal mortality from neonatal tetanus in low and middle-income countries: a systematic review', *BMC public health*, 13, p. 322.

Blencowe, H. *et al.* (2011) 'Clean birth and postnatal care practices to reduce neonatal deaths from sepsis and tetanus: A systematic review and Delphi estimation of mortality effect', *BMC Public Health*, 11(SUPPL. 3). doi: 10.1186/1471-2458-11-S3-S11.

CSA (2016) *Federal Democratic Republic of Ethiopia demographic and health survey 2016 key indicators report*, *The DHS Program ICF Rockville, Maryland, USA*.

Desalew, A. *et al.* (2020) 'Cause and predictors of neonatal mortality among neonates admitted to neonatal intensive care units of public hospitals in eastern Ethiopia: A facility-based prospective follow-up study', *BMC Pediatrics*, 20(1), pp. 1–12. doi: 10.1186/s12887-020-02051-7.

EPHI (2018) 'Ethiopian Emergency Obstetric and Newborn Care Assessment', (Ethiopian Public Health Institute, Addis Ababa, Ethiopia: 2018).

EPHI & ICF (2019) *Ethiopia Mini Demographic and Health Survey*.

Fenta, S. M., Biresaw, H. B. and Fentaw, K. D. (2021) 'Risk factor of neonatal mortality in Ethiopia: a multilevel analysis of 2016 Demographic and Health Survey', *Tropical Medicine and Health*, 49(1). doi: 10.1186/s41182-021-00303-5.

FMoH (2020) *Federal Ministry of Health of Ethiopia Performance report 2012 EFY (2019/2020)*.

HNN (2017) *Leading Causes of Neonatal Death in Ethiopia (2017)*.

Johnson, J. *et al.* (2006) 'The continuum of care – reaching mothers and babies at the crucial time and place', *Opportunities for Africa's Newborns*, pp. 23–36.

Karumbi, J. *et al.* (2013) 'Topical umbilical cord care for prevention of infection and neonatal mortality, *Pediatric Infectious Disease Journal*, 32(1), pp. 78–83. doi: 10.1097/INF.0b013e3182783dc3.

Karumbi, J. (2016) 'Do emergency obstetric referral interventions reduce maternal and neonatal mortalities in low- and middle-income countries ?', (August).

Kikuchi, K. *et al.* (2016) 'Effectiveness of continuum of care - Linking pre-pregnancy care and pregnancy care to improve neonatal and perinatal mortality: A systematic review and meta-analysis, *PLoS ONE*, 11(10), pp. 1–13. doi: 10.1371/journal.pone.0164965.

Kolobo, H., Chaka, T. and Kassa, R. (2019) 'Determinants of neonatal mortality among newborns admitted to neonatal intensive care unit Adama, Ethiopia: A case–control study, *Journal of Clinical Neonatology*, 8(4), p. 232. doi: 10.4103/jcn.jcn_23_19.

Lassi, Z. S. *et al.* (2015) 'Interventions to Improve Neonatal Health and Later Survival: An Overview of Systematic Reviews', *EBioMedicine*, 2(8), pp. 985–1000. doi: 10.1016/j.ebiom.2015.05.023.

Liu, L. *et al.* (2016) 'Global, regional, and national causes of under-5 mortality in 2000–15: an updated systematic analysis with implications for the Sustainable Development Goals', *The Lancet*, 388(10063), pp. 3027–3035. doi: 10.1016/S0140-6736(16)31593-8.

Mekonnen, Y. *et al.* (2013) 'Neonatal mortality in Ethiopia : trends and determinants', *BMC Public Health*, 13(1), p. 1. doi: 10.1186/1471-2458-13-483.

Oot, L. *et al.* (2018) 'The Effect of Late Breastfeeding Initiation on Neonatal Mortality: A Model in Profiles for Country-Level Advocacy', *Report*, (June), pp. 1–8. Available at: https://www.fantaproject.org/sites/default/files/resources/PROFILES-Brief-1-Breastfeeding-Jun2018.pdf.

Orsido, T. T., Asseffa, N. A. and Berheto, T. M. (2019) 'Predictors of Neonatal mortality in Neonatal intensive care unit at referral Hospital in Southern Ethiopia: A retrospective cohort study', *BMC Pregnancy and Childbirth*, 19(1), pp. 1–9. doi: 10.1186/s12884-019-2227-5.

PMNCH (2010) *PMNCH Knowledge Summary #02 Enable the Continuum of Care*. Available at: vhttps://www.who.int/pmnch/knowledge/publications/summaries/ks2/en/.

Rhee, V. *et al.* (2008) 'Maternal and birth attendant hand washing and neonatal mortality in southern Nepal', *Archives of Pediatrics and Adolescent Medicine*, 162(7), pp. 603–608. doi: 10.1001/archpedi.162.7.603.

Roro, E. M., Tumtu, M. I. and Gebre, D. S. (2019) 'Predictors, causes, and trends of neonatal mortality at Nekemte Referral Hospital, east Wollega Zone, western Ethiopia (2010–2014). Retrospective cohort study', *PLoS ONE*, 14(10), pp. 1–13. doi: 10.1371/journal.pone.0221513.

Seid, S. S. *et al.* (2019) 'Causes and factors associated with neonatal mortality in Neonatal Intensive Care Unit

(NICU) of Jimma University Medical Center, Jimma, South West Ethiopia', *Pediatric Health, Medicine and Therapeutics*, Volume 10, pp. 39–48. doi: 10.2147/phmt.s197280.

Thaddeus, S. and Maine, D. (1994) 'Too far to walk: Maternal mortality in context', *Social Science & Medicine*, 38(8), pp. 1091–1110. doi: https://doi.org/10.1016/0277-9536(94)90226-7.

Tolossa, T. *et al.* (2020) 'Impact of antenatal care on neonatal mortality among neonates in Ethiopia: a systematic review and meta-analysis', *Archives of Public Health*, 78(1), pp. 1–11. doi: 10.1186/s13690-020-00499-8.

UNICEF (2009) *The State of World's Children 2009*, *Vacuum*.

UNICEF (2019) *Monitoring the situation of children and women*. Available at: https://data.unicef.org/topic/maternal-health/newborn-care/.

UNICEF (2020) *Neonatal Mortality*. Available at: https://data.unicef.org/topic/child-survival/neonatal-mortality/.

WHO (2015) '100 Core Health Indicators', (1779), p. 28. Available at: apps.who.int/iris/bitstream/10665/173589/1/WHO_HIS_HSI_2015.3_eng.pdf%0Ahttp://ci.nii.ac.jp/naid/40020358184/.

WHO (2018) 'Survive and thrive: transforming care for every small and sick newborn. Key Findings', p. 9. Available at: https://apps.who.int/iris/bitstream/handle/10665/276655/WHO-FWC-MCA-18.11-eng.pdf?ua=1.

WHO & UNICEF (2020) 'The Every New Born Action Plan. Ending Preventable newborn deaths and stillbirths by 2030', (July). Available at: https://www.unicef.org/media/77166/file/Ending-preventable-newborn-deaths-and-stillbirths-by-2030-universal-health-coverage-in-2020–2025.pdf.

Winani, S. *et al.* (2007) 'Use of a clean delivery kit and factors associated with cord infection and puerperal sepsis in Mwanza, Tanzania', *Journal of midwifery & women's health*, 52(1), pp. 37–43. doi: 10.1016/j.jmwh.2006.09.004.

Wolde, H. F. *et al.* (2019) 'Factors affecting neonatal mortality in the general population: Evidence from the 2016 Ethiopian Demographic and Health Survey (EDHS)-multilevel analysis', *BMC Research Notes*, 12(1). doi: 10.1186/s13104-019-4668-3.

Yaya, Y. *et al.* (2014) 'Maternal and neonatal mortality in south-west ethiopia: Estimates and socio-economic inequality', *PLoS ONE*, 9(4). doi: 10.1371/journal.pone.0096294.

Zaidi, A. K. M. *et al.* (2011) 'Effect of case management on neonatal mortality due to sepsis and pneumonia', *BMC Public Health*, 11(SUPPL. 3), pp. 1–15. doi: 10.1186/1471-2458-11-S3-S13.

Zamorano, N. and Herrera, C. (2017) 'Can community-based intervention packages reduce maternal and neonatal morbidity and mortality? A SUPPORT Summary of a Systematic Review', (January).

Authors

[1]Zelalem Kebede, MPH

[1] Sabit Ababor, MPH

[1] Tesfaye Dagne, MPH

[1] Firmaye Bogale, MPH

[1] Dagmawit Solomon, MPH

[2] Aschale Worku, MPH

[2] Yared Tadesse, MD

[1,] Yosef Gebreyohannes, MPH

[1] Knowledge Translation Directorate, Ethiopian Public Health Institute

[2] Federal Ministry of Health, Ethiopia

Address for correspondence

Zelalem Kebede
Associate Researcher, Knowledge Translation Directorate,
Ethiopian Public Health Institute (EPHI)
P.O.Box 1242/5654, Addis Ababa, Ethiopia
Email: welzol@yahoo.com