



Original Article

Interventions to Improve Neonatal Health and Later Survival: An Overview of Systematic Reviews



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ARTICLE INFO

Article history:

Received 7 April 2015

Received in revised form 20 May 2015

Accepted 22 May 2015

Available online 31 May 2015

Keywords:

Stillbirths
Perinatal mortality
Neonatal mortality
Infant mortality
Child mortality
Survival

ABSTRACT

Background: Evidence-based interventions and strategies are needed to improve child survival in countries with a high burden of neonatal and child mortality. An overview of systematic reviews can focus implementation on the most effective ways to increase child survival.

Methods: In this overview we included published Cochrane and other systematic reviews of experimental and observational studies on antenatal, childbirth, postnatal and child health interventions aiming to prevent perinatal/neonatal and child mortality using the WHO list of essential interventions. We assessed the methodological quality of the reviews using the AMSTAR criteria and assessed the quality of the outcomes using the GRADE approach. Based on the findings from GRADE criteria, interventions were summarized as effective, promising or ineffective.

Findings: The overview identified 148 Cochrane and other systematic reviews on 61 reproductive, maternal, newborn and child health interventions. Of these, only 57 reviews reported mortality outcomes. Using the GRADE approach, antenatal corticosteroids for preventing neonatal respiratory distress syndrome in preterm infants; early initiation of breastfeeding; hygienic cord care; kangaroo care for preterm infants; provision and promotion of use of insecticide treated bed nets (ITNs) for children; and vitamin A supplementation for infants from six months of age, were identified as clearly effective interventions for reducing neonatal, infant or child mortality. Antenatal care, tetanus immunization in pregnancy, prophylactic antimalarials during pregnancy, induction of labour for prolonged pregnancy, case management of neonatal sepsis, meningitis and pneumonia, prophylactic and therapeutic use of surfactant, continuous positive airway pressure for neonatal resuscitation, case management of childhood malaria and pneumonia, vitamin A as part of treatment for measles associated pneumonia for children above 6 months, and home visits across the continuum of care, were identified as promising interventions for reducing neonatal, infant, child or perinatal mortality.

Interpretation: Comprehensive adoption of the above six effective and 11 promising interventions can improve neonatal and child survival around the world. Choice of intervention and degree of implementation currently depends on resources available and policies in individual countries and geographical settings.

Funding: This review was part of doctoral thesis which was funded by University of Adelaide, Australia.

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1. Introduction

The global burden of neonatal and child mortality is alarmingly high in low and middle income countries (LMICs). There has been a sharp decline in mortality rates in children under five years of age between 1990 and 2013 (from 90 mortalities per 1000 down to 46 mortalities per 1000 live births between 1990 and 2013). This rate needs to further

decrease, to just 30 mortalities per 1000 live births, in order to meet the Millennium Development Goals (MDGs) 2015 target (You et al., 2013).

Despite all the progress made in the last decade, it is very unlikely that the MDG targets will be met in many LMICs, where 99% of global deaths occur (You et al., 2013). In countries with a high burden of neonatal and child mortality, a variety of interventions could substantially reduce deaths and improve maternal and perinatal outcomes. Interventions and care primarily employed during different periods from antenatal to the later childhood period can facilitate reductions in neonatal and later mortality. However, a major obstacle in meeting the proposed reduction is that most neonatal and child health programs do not reach to those who need it the most. Therefore, effective

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interventions and care-based strategies need to be widely deployed to all and be delivered across the continuum of reproductive, maternal, neonatal and child health (RMNCH) care.

As we approach the deadline for the target of the MDGs and begin the journey towards achieving sustainable development goals (SDGs) we must focus efforts on programs and interventions shown to work. Several systematic reviews have evaluated the role of individual antenatal, natal, postnatal and child health interventions and their potential role at improving morbidity and mortality, however, there has been no overview on these interventions. Such an overview of systematic reviews of interventions to prevent neonatal and child mortality would facilitate the development of a definitive framework for preventing neonatal and child mortality in LMICs.

2. Methodology

In this overview of reviews, we have included all published Cochrane and the most recent (most latest on the given subject) other systematic reviews of randomized, non-randomized controlled trials of interventions and observational studies aiming to prevent perinatal (stillbirths + early neonatal mortality) or neonatal or child mortality (or stillbirths where either of these were not reported). We included interventions considered for improving neonatal and child survival and provided during pre-pregnancy, antenatal, childbirth and postnatal periods to mothers or the infant or child included in a set of 61 RMNCH interventions reported as essential interventions for reproductive, maternal, newborn and child health by the World Health Organization (WHO) (Panel 1) (Pmnch, 2011). We considered reviews that included women of reproductive age, including pregnant women at any stage of gestation, their newborns and children up to five years of age. This overview considered reviews on interventions which were compared against no placebo or treatment or control group (unless otherwise indicated).

All available recent non-Cochrane and updated or most recent Cochrane systematic reviews were identified from the Cochrane Library and PubMed using the search strategy devised for each intervention separately during Nov 2012 to Jan 2013 (Supplementary Table 1). The search terms were limited to title, abstract, or keywords. The methodology for data collection and analysis is based on the Cochrane Handbook of Systematic Reviews of Interventions (Higgins and Green, 2011). The outcomes of interest for this overview of reviews were perinatal mortality, neonatal mortality, infant mortality and under-five mortality reported as primary or secondary outcomes in included reviews.

The protocol for this overview is registered with PROSPERO 2014: CRD42014007091 (http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42014007091#.U75a1RCLMiw). Two review authors (ZSL and PM) independently assessed the inclusion of all the potential systematic reviews and extracted information using a predefined form (intervention, comparison, mortality outcome, type of studies included – Characteristics of included reviews Supplementary Table 2). Any disagreement was resolved through discussion or, where required, we consulted a third person. We addressed two different quality assessments in this overview: the quality of evidence in the included reviews (Table 1) using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach (Guyatt et al., 2008; Oxman and Group, 2004) and the methodological quality of the systematic reviews using the ‘assessment of multiple systematic reviews’ (AMSTAR) measurement tool (Shea et al., 2007) (Supplementary Table 3). We did not update individual reviews. Where reviews did not prepare and report mortality outcomes using GRADE-pro software (Brozek et al., 2008), we formulated ‘summary of findings’ tables. The following criteria were taken into account to grade the evidence: study limitations (risk of bias for the outcome of interest), consistency of effect, imprecision,

Panel 1

List of interventions reviewed.

Pre pregnancy interventions
Family planning
Prevention and management of sexually transmitted infections including HIV
Folic acid fortification and/or supplementation
Pregnancy interventions
Antenatal care
Iron and folic acid supplementation during pregnancy
Tetanus immunization in pregnancy
Prophylactic antimalarial and insecticide treated bednets for preventing malaria in pregnancy
Interventions for smoking cessation during pregnancy
Screening and treatment of syphilis
Prevention and management of HIV and prevention of mother to child transmission in pregnancy
Calcium supplementation in pregnancy
Low-dose aspirin for the prevention of pre-eclampsia
Use of antihypertensive drugs for treating severe hypertension in pregnancy
Prevention and treatment of eclampsia
Reduce mal presentation at term using external cephalic version (>36 weeks)
Induction of labour for management of premature rupture of membranes at term.
Antibiotics for management of preterm rupture of membranes
Childbirth interventions
Corticosteroids for preventing neonatal respiratory distress syndrome
Management of unintended pregnancy
Social support during childbirth
Prophylactic antibiotic for caesarean-section
Prevention of postpartum haemorrhage: prophylactic uterotonic to prevent postpartum haemorrhage
Active management of third stage of labour to prevent postpartum haemorrhage
Induction of labour for prolonged pregnancy
C-section for absolute maternal indication (e.g. obstructed labour and central placenta previa)
Management of post-partum haemorrhage e.g. uterine massage
Uterotonics
Postpartum interventions
Advice and provision of family planning
Prevent, measure and treat maternal anaemia
Detection and management of postpartum sepsis
Screening and initiation or continuation of ARV therapy for HIV
Neonatal interventions
Promotion and provision of thermal care for all newborns to prevent hypothermia
Promotion and support for early initiation and exclusive breastfeeding (within the first hour)
Promotion and provision of hygienic cord and skin care
Neonatal resuscitation with bag and mask for babies who do not breathe at birth
Newborn immunization
Presumptive antibiotic therapy for the newborns at risk of bacterial infection
Case management of neonatal sepsis, meningitis and pneumonia
Kangaroo mother care for low birth babies
Extra support for feeding the small and preterm baby
Prophylactic and therapeutic use of surfactant to prevent respiratory distress syndrome in pre-term babies
Continuous positive airway pressure (CPAP) to manage pre-term babies with respiratory distress syndrome
Management of newborns with jaundice
Infant and child health interventions
Promotion and support for exclusive breastfeeding for 6 months
Continued breastfeeding up to 2 years and beyond
Appropriate complementary feeding starting at 6 months
Provision and promotion of use of insecticide treated bed nets for children
Case management of childhood malaria
Comprehensive care of children infected or exposed to HIV infection
Promote and provide routine immunization plus <i>H. Influenza</i> , meningococcal, pneumococcal, and rotavirus vaccines
Vitamin A supplementation from 6 months of age in Vitamin A deficient populations
Management of severe acute malnutrition
Case management of childhood pneumonia
Vitamin A as part of treatment for measles-associated pneumonia for children above 6 months
Vitamin A as part of treatment for non-measles-associated pneumonia for children above 6 months
Case management of diarrhoea: Acute watery diarrhoea
Dysentery
Cross cutting intervention
Home visits across the continuum of care women's groups

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