Perinatal and Neonatal mortality among the Mijikenda Community of Kilifi District

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Abstract

Background: Neonatal mortality contributes substantially to the overall childhood mortality yet these deaths are preventable with relatively cheap interventions. This paper describes perinatal and neonatal mortality over a period of two years in both the community and in a district hospital. The causes of neonatal admission and death are discussed as a pre-requisite to a wider study of cause of perinatal and neonatal mortality in the community.

Methods: Data from Kilifi integrated data management system between 2004-5 linking both the demographic surveillance system (DSS) and the clinical data of Kilifi District Hospital are used. The pregnancy status of resident women of reproductive age (15-49 years) is monitored during the community surveillance and subsequent outcomes recorded. The maternity ward also records pregnancy outcome including stillbirths for women who deliver in the hospital. Mortality levels in the community and in the hospital are estimated using standard methods.

Results: Neonatal deaths contributed 46% of under-five deaths and 65% of infant deaths in 2004-5. Neonatal and infant mortality rates were 34 and 56 per 1000 child year observed respectively. Perinatal mortality was 44 per 1,000 live births. Among hospital inpatients the case fatality rate was 23% for neonates and 8% for all children aged 0-13years. Neonatal admissions and deaths were attributed to neonatal sepsis (45% and30%), jaundice (23% and 12%), pre-maturity (12% and 30%) and birth asphyxia (10% and 18%). The case fatality rate was 63% tetanus, 56% pre-maturity, 42% congenital malformation, 39% birth asphyxia and 15% neonatal sepsis.

Discussion: In Kilifi, neonatal mortality rates constitute a high proportion of all infant deaths. Among neonates admitted to hospital the commonest causes of admission and death are infections, obstetric complications and pre-maturity. The large number of stillbirths, pre-term deliveries and neonatal deaths may be related to HIV and other sexually transmitted infections of the mothers. Most neonatal deaths occurred in the community where the cause of death is unknown highlighting the prescient need for community-based studies of perinatal events and early childhood risk factors in our area.

Introduction

Over 9 million children in the world die very early during the perinatal and neonatal periods . Nearly all (98%) of these deaths occur in the developing world of known and preventable causes like infectious diseases and pregnancy or delivery related complications (WHO, 2006). Neonatal mortality contributes between 40-70% of infant mortality. Trends in mortality show perinatal and neonatal mortality declining less rapidly compared to infant and under-five mortality (WHO, 2006). This paper describes levels of perinatal and neonatal mortality and infers possible causes from hospital admissions. The paper concludes by shedding light on interventions with impact on perinatal and neonatal mortality.

The Kilifi DSS was established in 2000/1 when an area of 891 km^2 stretching 30km up and down the Coast was digitally mapped for roads, footpaths and homesteads and its resident population registered. The boundaries were selected to represent the residential area of 80% of paediatric admissions to the Kilifi District Hospital (KDH). Data collection is undertaken at homestead level once every four months. All field based data is checked, double entered and verified within 48 hours of acquisition. This is used to maintain a database population register available at all clinical centres at the hospital. The resident population was 212,350 and 220,736 in 2004/5 respectively living in about 25,000 homesteads. Sex ratio was 88:100. The population was youthful with 59% under the age of 20 years. Resident births were 7725 and 8236 for 2004/5 respectively. Net migration was -1.6% with a dominance of male out-migrants.

Majority of the members of the community belong to the Mijikenda group that comprises of nine clans with the largest being Giriama (45%), Chonyi (32%) and Kauma (11%). About 21% have never been to school, majority (77%) of whom are women. There are more males (53%) than females in primary school with increasing gender disparities at higher levels of schooling. A higher proportion of the community are Christians (47%) followed by Traditionalists (24%), Muslims (13%), others which includes hindus (12%) and no religious affiliation (4%).

Data

Data from Kilifi integrated data management system (KIDMS) was used. KIDMS was implemented in April 2002 in a Filemaker Pro platform. The initial implementation linked the DSS (the population register) and the paediatric surveillance system. This allowed inpatients to be identified on the DSS population register upon admission at (KDH) wards. The linkage has extended to maternity and adult wards. The population census, done in 2000/1, created the base population where each individual was assigned a unique personal identifier (PID). PID is used to identify individuals and to merge data files from DSS with those from disease surveillance. Clinical details are generally captured at the point of admission, during patient transfer between wards and at discharge. Internal consistency is achieved through rules that have been defined onto the system to ensure accurate information. More quality control checks are performed after the data has been extracted from the system using STATA programs.

Births and deaths were recorded in the field and at hospital. The key variables were live births, stillbirths, deaths in the first one week and month of life, admissions to children aged 0 to 28 days, cause of admission and death.

Methods

Frequencies of age at death, year of death and place of death were made. Hospital neonatal deaths were classified by cause of death. Admissions were classified by age and cause of admission. The exact time at risk was defined for residents in the DSS using the DSS population register. The period at risk was terminated by an out-migration, death or the defined end of study period which was 31st December, 2005. Neonatal and infant mortality was described as the probability of dying within the first month and year of life respectively and expressed per 1000 child years lived. Perinatal mortality was defined as the sum of stillbirths and deaths in the first week of life divided by the sum of stillbirths and live births expressed per 1,000 (Newell C, 1988:65). Case fatality was calculated as the cases dying compared to admissions.

Results

Neonatal mortality

Most childhood deaths occurred in the first year of life (71%) and most of the infant mortality was in the first month. Neonatal deaths account for 65% of infant mortality and 46% of under-five mortality, as shown in the table below. Mortality declined over the two years by 5%, 7% and 9% for neonatal, infant and under-five mortality respectively.

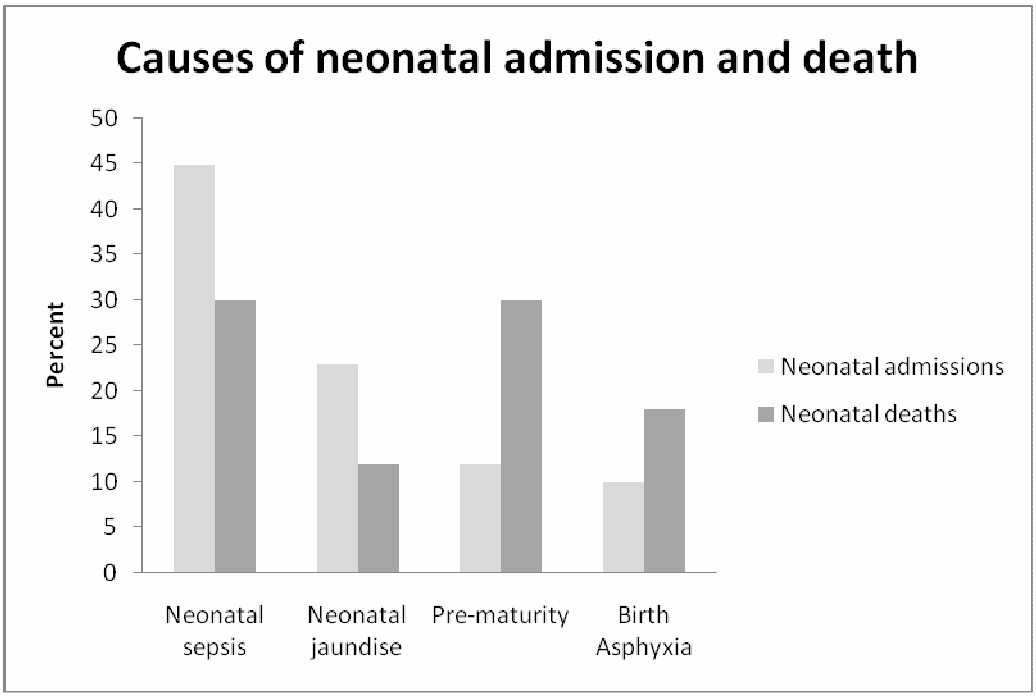
	Number of deaths			
	2004	2005	Total	%
Under one month	271	251	522	46
Under one year	427	373	800	71
Under five years	617	516	1133	

Neonatal mortality rate was 36 and 31 per 1000 child years lived and infant mortality rate was 54 and 47 per 1000 child years lived for 2004-5 respectively.

Causes of Neonatal Mortality

KDH admit close to 5,000 children aged between 0 and 13 years every year. During the two year period 2004/5, 9626 children were admitted and 13% (1276) were neonates. 736 children died of whom 288 (39%) were neonates. The case fatality for neonates was 23% and 8% for all admissions.

The figure below shows the main causes of neonatal admission and death. Neonatal sepsis is the main cause of admission and death with 45% and 30% respectively. Pre-maturity and birth asphyxia have relatively fewer admissions but are major causes of neonatal deaths with 30% and 18% respectively. The case specific fatality rates were tetanus (63%), pre-maturity (56%), congenital malformation (42%) and birth asphyxia (39%).



Perinatal mortality
Perinatal mortality includes late foetal mortality and neonatal deaths in the first week of life largely because they are determined by similar causes. In 2004-5 there were 421deaths under one week, 293 stillbirths and 15961 live births. Perinatal mortality rate was estimated as 44 per 1,000 live births.

Place of delivery and pregnancy outcome
Majority of the women in sub-saharan Africa deliver at home. In Kilifi 60% of the women deliver at home and 37% at KDH while 3% share private and other surrounding public health facilities. Most pregnancy outcomes are term deliveries (93%).

Discussion

Neonatal mortality among the Mijikenda of Kilifi is high both in the community and at the district referral hospital where the case fatality rate is almost 3 times that of all admissions. The leading causes for neonatal admission and death were neonatal sepsis, pre-maturity and asphyxia. Case fatality rate was highest for tetanus, prematurity, congenital malformation and asphyxia. These results suggest areas of possible research and intervention. The prime target areas are the various levels of child development, during pregnancy, at delivery and after delivery. Studies have shown great potential of simple interventions in reducing perinatal and neonatal mortality and are reviewed to provide insights into possibilities in favour of reducing the huge burden of perinatal and neonatal mortality for the Mijikenda of Kilifi.

Intervention during pregnancy
Healthy women are likely to deliver healthy babies. But in Kilifi where famine and malaria are endemic women are likely to suffer ill health. Yet subsidizing for nutrition deficiencies during pregnancy is known to improve pregnancy outcomes. For

example, Ceesay increased the daily calorie intake for pregnant women in the Gambia by 900 calories and reduced stillbirths, perinatal and neonatal mortality by 55%, 49% and 40% respectively (Ceesay et al 1997:786-90).

Malaria is associated with spontaneous abortions and stillbirths, low birth weight, and neonatal mortality. Providing malaria prophylaxis to pregnant women in Kilifi showed marked reduction in perinatal and neonatal mortality. Shulman treated pregnant women with fansidar and reduced perinatal and neonatal mortality by 22% and 38% respectively (Shulman CE et al, 1999:632-6).

Most children with neonatal tetanus die and those who survive are likely to develop brain damage (J.L Barrow et al 2001). Vaccinating pregnant women with tetanus toxoid reduce the risk of neonatal tetanus and subsequent death or brain damage. A study carried out by Black immunizing pregnant women with tetanus toxoid reduced neonatal mortality in the first 2 weeks of life from 30/1000 to 10/1000 live births (Black RE et al 1980:927-930).

Antenatal clinics give pregnant mothers tetanus toxoid, malaria prophylaxis, iron supplements and monitor pregnancy progress to keep them healthy during pregnancy. Unfortunately some women do not attend antenatal clinics and therefore miss this service. This number is quite large in Kilifi where 47% of pregnant women do not attend antenatal clinics. These clearly miss health education, tetanus toxoid , malaria prophylaxis and iron supplements. Reaching such women would probably require an intervention of door to door campaign not only explaining the value of attending antenatal clinics but also distributing malaria prophylaxis and iron supplements.

Intervention at Delivery

Recognising early warning signs of pregnancy problems and referring the woman to a health facility with resources to handle a complicated delivery can reduce perinatal and neonatal mortality. Messages targeting men and women in the reproductive age to sensitize them on the danger signs and appropriate referral facilities can be made through television and popular radio stations. Messages can also tell those who deliver at home to ensure a clean environment and to use sterilized blade and string for cord management. Such public awareness and referral reduced perinatal and early neonatal mortality by 34 and 25% respectively in Shunyi of China (Yan et al, 1989:23-6). Nepalese women encouraged to deliver in clean environment using clean home delivery kits and empowered through mother-child-health fund reduced neonatal mortality by 30% in only 30 months (Morrison J. et al, 2005).

A fatal problem arising from prolonged labour and small babies is asphyxia. At KDH case fatality for asphyxia was 39% but for the 60% delivered at home the case fatality may be much higher. To address this problem, we should intensify campaigns encouraging mothers to deliver at a health facility and also train and allow retired mid-wives, nurses and community health workers to give simple bag and mask resuscitation. This would save lives of many children who die of asphyxia every year.

Intervention after delivery

Children born in a health facility are given BCG and Polio vaccines and mothers delivering at home are encouraged to take the child to a health facility for vaccination immediately. Breastfeeding is ideal for all infants and mothers are encouraged to

breastfeed the child immediately after birth and on demand afterwards except where the mother is HIV positive. Studies have shown that neonates fed entirely on breast milk have the lowest risk for mortality compared to those fed on breast-milk with baby formula or those who did not breastfeed at all (Victora et al, 1987:319-21). Healthy children born at a health facility or referred immediately after a home delivery are immunized and their growth monitored for at least one year increasing their survival. But premature babies with a case fatality rate of 56% have a very low chance of surviving. Pre-term mortality levels are likely to be higher among home deliveries where management of pre-term babies is clearly difficult. Kangaroo care methods of managing pre-term babies have shown improved survival (Bergman, 1994:57-60).

Simple targeted interventions during gestation period, at delivery and thereafter suggest untapped potential to reduce perinatal and neonatal mortality of the Mijikenda people of Kilifi.

Reccommendations

- Cohort studies to follow pregnant women and neonates to document maternal and neonatal care of the Mijikenda people.
- Promote simple home based maternal-child interventions to supplement existing programmes.

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