WORLD HEALTH ORGANIZATION
Regional Office for the Eastern Mediterranean
ORGANISATION MONDIALE DE LA SANTE
Bureau régional de la Méditerranée orientale

منظمة الصحة العالمية
المكتب الإقليمي لشرق المتوسط

Regional Committee for the Eastern Mediterranean

EM/RC54/3
August 2007

Fifty-fourth Session

Original: Arabic

Agenda item 6 (a)

Technical paper

Neonatal mortality in the Eastern Mediterranean Region: determinants and strategies for achieving Millennium Development Goal no. 4

It is estimated that around 40% of the under-5 mortality in the Region occurs in the neonatal period (about 60% of infant deaths). Neonates have unique needs that currently fall between maternal and child health care services in the Region and that need to be addressed in that context. It will be difficult to achieve Millennium Development Goal no. 4 in several countries in the Region without substantial advances in promoting neonatal health and without greater efforts to expand coverage with the available cost-effective interventions.

The Regional Committee is invited to consider ways in which to address the situation.

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Executive summary

Progress in achieving Millennium Development Goal no. 4 to reduce under-five deaths, to which all countries have committed, has been slow in several countries in the Eastern Mediterranean Region in recent years. As reported in the 52nd session of the Regional Committee, if current trends continue, many countries will be unable to achieve this goal. Since around 40% of the 1.5 million under-five deaths in the Region occur in the neonatal period, especially in the first week of life, it is clear that without addressing this period and injecting fresh investments, Millennium Development Goal no. 4 will remain a distant goal for many. Furthermore, it is more than a survival issue: the causes of newborn deaths can result in severe and lifelong disability in surviving babies.

Neonatal infections, prematurity, birth asphyxia and congenital disorders account for 94% of neonatal deaths. Contrary to general perceptions, most of these conditions can be managed by relatively simple, evidence-based, cost-effective interventions, which require no sophisticated skills or technology in countries with high child mortality. The health of the neonate is closely linked to the health of the mother, particularly during pregnancy and childbirth. Three quarters of perinatal deaths and at least 30%–40% of infant deaths can be avoided with improved maternal health, adequate nutrition during pregnancy, appropriate management of deliveries and appropriate care of newborn infants. Birth spacing, antenatal interventions and skilled attendance at birth have an impact on neonatal health. In addition, household and community newborn care, adequate breastfeeding practices, keeping the baby warm, recognizing when to seek care and managing infections can make a big difference to neonatal survival, with benefits extending beyond that period.

Unfortunately, the level of implementation of the existing cost-effective interventions, whether delivered in the community or at health facilities, is low, especially where most needed; the poorest and most disadvantaged populations, who are the most at risk, lack access to such interventions. This is coupled with weak health systems and lack of newborn life-saving services at different health system levels. Pre-service education, which has the potential for sustainable outcomes, receives little attention compared to in-service approaches. Support for achieving universal coverage with effective interventions under the Integrated Management of Child Health (IMCI) strategy and Making Pregnancy Safer (MPS) initiative is lacking. Political commitments, when made, often lack effective actions to be of practical value.

There is a need to: translate commitments to the Millennium Development Goals and child health into effective actions, through investing adequate financial and human resources; develop policies enabling equitable access of the poor to antenatal, postnatal, birth spacing, newborn and post-neonatal care and strategies to ensure a continuum of care during pregnancy and at birth and caring for the newborn child in the home, strengthening health systems, and incorporating the new knowledge and provision of skills into the teaching programmes of medical and paramedical schools; implement community-based and facility-based interventions within maternal and child health strategies, including health education and communication; and collect data vital for planning.

1. Introduction

The Eastern Mediterranean Region is a “young” region, with children under 5 years of age constituting 15% of its population [1]. A dramatic 45% decline in the under-5 mortality rate was experienced in the Region in the 20th century, particularly the second half, from about 167 per 1000 live births in 1970 to 92 per 1000 live births in 2005 [2]. This reduction can largely be attributed to improvements in socioeconomic status; immunization coverage for vaccine-preventable diseases; successful programmes for control of diarrhoeal diseases and acute respiratory infections, and in recent years, the strategy of Integrated Management of Child Health (IMCI); improvement in maternal health; and reduction in the number of high-risk births. This decline in under-5 mortality was mainly in the period after one month of age, i.e. from month 2 to year 5; the neonatal period did not witness the same level of decline. Hence, in many countries, an increasing proportion of child deaths are now accounted for in the neonatal period.

It is estimated that around 40% of the under-5 mortality in the Region occurs in the neonatal period (about 60% of infant deaths). Since the health of the neonate is known to be closely linked to the health of the mother, appropriate care of the pregnant mother during pregnancy and childbirth would contribute to a reduction in perinatal and neonatal morbidity and mortality. However, neonates have unique needs that currently fall between maternal and child health care services in the Region and that need to be addressed in that context. Millennium Development Goal no. 4 aims to reduce the under-5 mortality rate by two-thirds of the 1990 level by 2015. If current trends continue it will be difficult to achieve this goal in several countries in the Region without substantial advances in promoting neonatal health and without greater efforts to expand coverage with the available cost-effective interventions [3].

Three-quarters of perinatal deaths and at least 30% to 40% of infant deaths could be avoided with improved maternal health, adequate nutrition during pregnancy, appropriate management of deliveries and appropriate care of newborn infants. The close linkages between maternal and child health have become less recognized over time, and this has been manifest in separate planning, separate interventions and less coordination. The need for a holistic approach, that ensures continuity, full coordination and complementarity between maternal and child health, should therefore be recognized in order to maximize the impact of programmes and utilization of available resources at the country level [2].

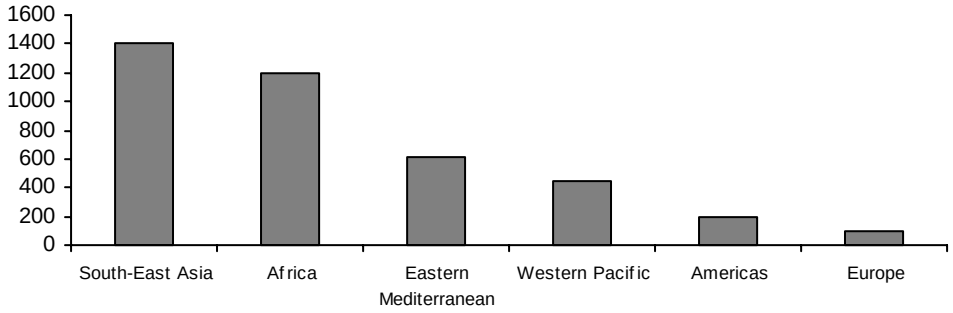
2. Global situation

Although a good start in life begins well before birth, it is just before, during and in the very first hours and days after birth that life is most at risk. Babies (and their mothers) continue to be very vulnerable throughout their first week of life, after which their chances of survival improve markedly. Most neonatal deaths are unrecorded in any formal registration system, hence global analysis is based on estimates. The most recent estimates suggest that of the 130 million babies born every year, about 4 million die in the first 4 weeks of life – the neonatal period [4]. A similar number of babies are stillborn – dying in utero during the last three months of pregnancy. Only about 1% of those deaths are in 39 high-income countries, where the average neonatal mortality rate is 4 per 1000 live births. The remaining 99% of deaths are in low-income and middle-income countries where the average neonatal mortality is estimated to be 33 per 1000 live births. About two-thirds of neonatal deaths occur in the African and South-East Asian regions of WHO. The countries with the largest absolute numbers of deaths are mainly in south Asia, because of the large populations in that region; India alone contributes a quarter of neonatal deaths. Ten countries account for two-thirds of neonatal deaths (Table 1), however the countries with the highest rates of neonatal mortality are mostly in sub-Saharan Africa (14 of the 18 countries with neonatal mortality rate above 45 per 1000 live births) [2]. According to the World Health Report 2005 [2], the number of neonatal deaths in the Eastern Mediterranean Region ranks third after the South-East Asia and African Regions (Figure 1).

3. Regional situation

3.1 Magnitude of the problem

Around 610 000 children die every year in the first month of life in the Eastern Mediterranean Region, out of the 3 910 000 neonatal deaths occurring worldwide (15.6% of the global burden). Two countries of the Region, Pakistan and Afghanistan, rank third and ninth respectively, among the 10 countries that account for 67% of global neonatal deaths (Table 1). Together these two countries account for 9% of global neonatal mortality. The average neonatal mortality rate for the Region as a whole was estimated at 32.7 per 1000 live births in 2004, which is around 40% of the under–five mortality rate. However, there are great variations and disparities in neonatal mortality levels between and within countries of the Region, ranging from 5 per 1000 live births in Bahrain to 63 per 1000 live births in Iraq. More than 95% of the infant mortality in the Region is represented by seven countries only (Afghanistan, Djibouti, Morocco, Pakistan, Somalia, Sudan and Yemen) [1].



Source: [2]

Figure 1. Number of neonatal deaths (× 1000) by WHO Region, 2000–2003

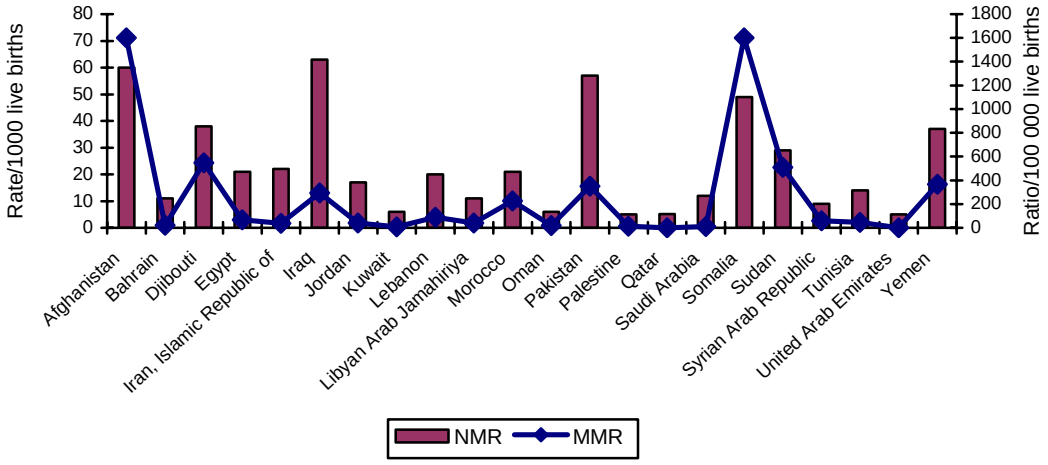
Table 1. Countries with largest numbers of neonatal deaths worldwide

	Neonatal deaths (1000s)	Percentage of global neonatal deaths (*n* = 3.9 million)	Neonatal mortality rate (Per 1000 live births)
India	1098	27%	43
China	416	10%	21
Pakistan	**298**	**7%**	**57**
Nigeria	247	6%	53
Bangladesh	153	4%	36
Ethiopia	147	4%	51
Democratic Republic of Congo	116	3%	47
Indonesia	82	2%	18
Afghanistan	**63**	**2%**	**60**
United Republic of Tanzania	62	2%	43
Total	2682	67%	

Source: [2]

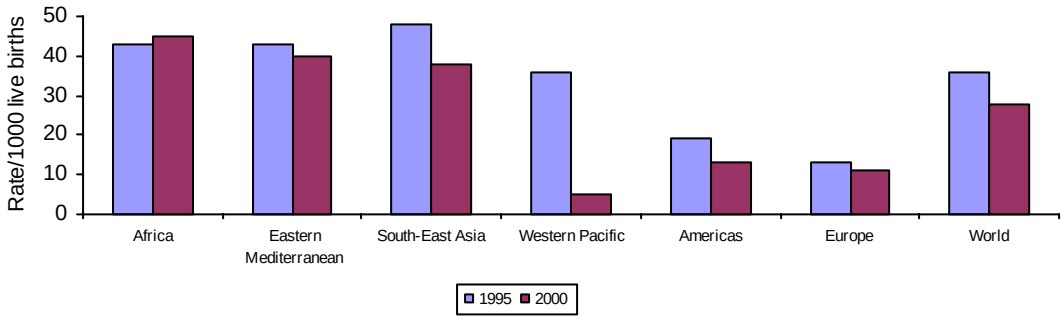
There are many reasons why the health of neonates has been neglected despite the large number of deaths. Most neonatal deaths are unseen and undocumented. In many developing countries, when childbirth takes place at home mother and baby are kept hidden with limited access to care. Often babies are unnamed, and consequently not registered in the national vital records, until 1 or even 6 weeks has passed, reflecting a sense of fatalism and cultural acceptance of high mortality [2,3].

It is estimated that over 529 000 women die annually from complications during pregnancy, childbirth or the postpartum period. One tenth of global maternal deaths (around 53 000) occur every year in the Eastern Mediterranean Region. Almost 60% of the burden of maternal mortality in the Region is shared by two countries (Afghanistan and Pakistan), and more than 95% of this burden is shared by seven countries (Afghanistan, Iraq, Morocco, Pakistan, Somalia, Sudan and Yemen), almost the same countries which suffer from high neonatal mortality rates (Figure 2). Neonatal mortality has not been measured for long enough to reach reliable conclusions on trends, but WHO estimates from 1995 to 2000 suggest that there was a small reduction in neonatal mortality in the Eastern Mediterranean Region (Figure 3). However, regional averages mask variations between countries [1].



Source: WHO Department of Making Pregnancy Safer, 2006

Figure 2. Relation between maternal mortality ratio (MMR) and neonatal mortality rate (NMR) in the Eastern Mediterranean Region



Source: [2]

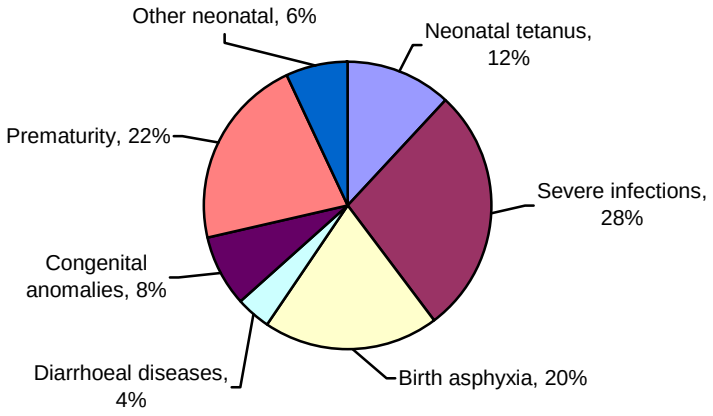
Figure 3. Progress in reduction of neonatal mortality in different regions

Interventions to reduce neonatal deaths belong to two health system areas: maternal health care covering pregnancy, childbirth and early neonatal care; and child health care, from infancy into childhood. Addressing neonatal mortality requires a continuity between these elements of care which is lacking in many settings. Care for the neonate often receives little attention in either maternal or child health care programmes. The greatest gap in care often falls during the critical first week of life when most neonatal deaths occur, often at home and without contact with the formal health care system.

3.2 Causes of neonatal death

Infectious diseases, which play a major role in the death of older infants and children, are responsible for a substantial proportion (44%) of deaths in neonates also, especially late neonatal deaths, more so in poor settings and where neonatal mortality rates are higher. Interventions designed to prevent and treat these conditions in older infants and children (e.g. early initiation of breastfeeding, availability of antibiotics) may be used with some adaptation to benefit also neonates. However, neonates die from causes other than infections also, especially in the first week of life. Overall, the direct causes of neonatal mortality in the Region are: neonatal infections (44%, including severe infections, comprising sepsis and pneumonia, neonatal tetanus and diarrhoea), prematurity (22%), birth asphyxia (20%), congenital disorders (8%), and other (6%) (Figure 4) [1,2,4].

The proportional contribution of infectious diseases and asphyxia to neonatal deaths tends to be lower, and that of prematurity and congenital disorders tends to be higher, in settings with lower neonatal mortality, and vice versa in settings with higher neonatal mortality. The conditions causing newborn death can also result in severe and lifelong disability in babies who survive. While data are limited, it is estimated that each year over a million children who survive birth asphyxia develop problems such as cerebral palsy, learning difficulties and other disabilities. Deaths attributable to prematurity, congenital anomalies and asphyxia, which together account for about half of newborn deaths, mostly occur in the first week of life. It is worth noting that most neonatal and maternal deaths occur at that time and at home.



Source: [2]

Figure 4. Causes of neonatal deaths in the Eastern Mediterranean Region

3.3 Determinants of neonatal health

Health of the neonate

The health of the neonate at delivery is an important determinant of neonatal and future child health. Low birth weight, congenital anomalies, other hereditary diseases (blood diseases, etc) might be an indirect cause of death or a source of weak health and disability in the future. The high prevalence of low birth weight (19.5%) in the Region is a matter of concern. Low-birth-weight infants are at 40 times greater risk of neonatal death than normal weight babies and 5 times greater risk of post-neonatal deaths. Low birth weight arises through short gestation (preterm birth) or in utero growth restriction or both. Low-birth-weight babies are at high risk of mortality, and are very vulnerable to infections and other hazards. Although low-birth-weight babies constitute 19.5% of children born, they account for 60%–80% of neonatal deaths either directly or indirectly [1,2,4].

Care of the neonate

Postnatal care of mothers and newborn infants has an important role in ensuring neonatal health and reducing neonatal mortality. It is an area that requires strengthening in most countries of the Region, particularly in providing mothers with information and skills for essential care, such as guidance and support on early initiation and exclusive breastfeeding, keeping the baby warm, early recognition of danger signs and the importance of seeking prompt treatment from adequate providers, as well as their own health needs. Breastfeeding is one of three interventions where there is evidence not only of efficacy but also of effectiveness (the other two being maternal tetanus toxoid immunization and community-based pneumonia case management) [5]. WHO estimates show that lack of early initiation of breastfeeding can increase neonatal mortality by 4–4.5 times. Current exclusive breastfeeding rates in countries of the Region are unacceptably low. Neonates who are not exclusively breastfed are at higher risk of death due to infections, particularly diarrhoea and pneumonia.

In many countries, health services are not equipped to deal with early neonatal resuscitation and management at the different health system levels, and where such services exist, access is poor. Health providers typically do not have adequate capacity, in terms of sufficient trained health workers, to deal with neonates. These are all major factors affecting the quality of care provided to neonates. Cost effective interventions are available to deal with neonatal health at primary health care level, such as the package on Integrated Management of Child Health (IMCI), but are not yet implemented universally. Moreover, in some key countries with high under-five (and neonatal) mortality, progress in improving IMCI coverage is slow. Quality of care at the referral level needs to be strengthened in many countries.

Neonatal health care differs according to each country’s situation and problems. In countries where the under-five mortality rate is high, the late neonatal mortality increases, mainly caused by infections and asphyxia. Simple interventions can achieve radical reduction of neonatal mortality in this context without the need for large investments in sophisticated technology. The challenge is to find ways of improving the health care system to ensure continuity of care from pregnancy, through childbirth to care of the neonate at home [2,5]. Evidence shows that health professionals can easily acquire the necessary skills without needing to become “specialists”.

In countries where the level of under-five mortality is low or decreasing, the late neonatal mortality, mainly caused by infections, also decreases while the contribution of causes of early neonatal mortality/prematurity, low birth weight, congenital anomalies, hereditary diseases, etc.) consequently increases. This means that, in addition to investment in preventive aspects and maternal health and care, and in simple low cost interventions to manage common conditions such as infections, asphyxia, etc., interventions involving sophisticated technology might also be needed.

Health of the mother

Age: The age at which giving birth is physically risky for a woman varies significantly, depending on general health conditions and access to prenatal care. The negative health outcomes of pregnancies occurring after the age of 35 years, on both the mother and newborn babies, have been well

documented, especially for obstructed labour and some chromosomal aberrations (such as Down syndrome). There are considerable health risks to pregnancy before the age of 18 years, accounting for 15% of the global burden of disease for maternal conditions and 13% of all maternal death [6]. Pregnant adolescents aged 15–19 years are twice as likely to die during childbirth, and those under age 15 are 5 times as likely to die during childbirth as women in their 20s [7]. As a result, neonatal mortality is 3 to 5 times higher among children born to adolescent mothers [8]. Lack of information about pregnant adolescents' needs means that service providers are poorly equipped to deal with them. Failure on the part of communities to acknowledge and address issues related to and stemming from the problem, further complicates the situation. Major barriers preclude adolescents' access to maternal health care services.

Birth spacing: The health hazards resulting from poor birth spacing, leading to too close and too many pregnancies are well established. In the seven countries of the Region where almost 95% of maternal and neonatal deaths take place, the percentage of married women using contraceptives is 26.5% only, compared with an average for the Region of 40% [9]. Promotion of family planning among married women is an effective intervention to prevent avoidable morbidity and mortality among children, especially neonates, and their mothers.

Consanguinity: One distinctive feature of the Region is the relatively high rate of consanguineous marriage, i.e. between relatives (in particular, between cousins). Consanguineous marriage is particularly high in Libyan Arab Jamahiriya, Saudi Arabia and Sudan, where 40%–50% of ever-married women aged 15 to 49 years are married to their first cousins [10]. These consanguineous marriages are not necessarily arranged marriages; they may well reflect the wishes of the marrying partners. Consanguinity can negatively affect the health of children, as can marriage among families with a history of genetic diseases. It is worth mentioning that 8% of neonatal mortality in the Region is caused by congenital anomalies [2].

Nutrition and anaemia: Malnutrition in women contributes to complications and death during pregnancy and childbirth. Women who are stunted from malnutrition during childhood are at greater risk of needing an assisted delivery than taller women. Anaemia is a life-threatening complication for women during pregnancy and puts them at risk of dying from even small amounts of blood loss during the delivery and postpartum periods. Women with severe anaemia are particularly at risk and have a 3.5 times greater chance of dying than women without anaemia. More than 40% of pregnant women are anaemic in the Region [9]. Under-nutrition and anaemia in pregnancy are major causes of low birth weight among newborn babies. The prevalence of low birth weight is significantly higher in countries with high magnitude of maternal deaths, such as Afghanistan, Iraq, Pakistan and Yemen [9].

Infectious diseases in pregnancy: The serious outcome of some infectious diseases occurring in pregnancy and their consequences for neonatal health and mortality are well documented. They include syphilis, malaria, HIV/AIDS, toxoplasmosis, rubella, cytomegalovirus infection and *Herpes simplex*, and increase the chance of maternal anaemia, spontaneous abortion, stillbirth, prematurity, intrauterine growth retardation and infant low birth weight.

Maternal care

The death of a neonate during the first week of life is most likely the result of inadequate or inappropriate care during pregnancy, childbirth and the first critical hours after birth. Asphyxia and birth injuries may result from poorly managed labour and delivery and lack of access to obstetric services. Neonatal infections such as tetanus and congenital syphilis can be prevented by care during pregnancy and childbirth. It has been argued that nearly three quarters of all neonatal deaths could be prevented if women were adequately nourished and received appropriate care during pregnancy, childbirth and the postnatal period.

Antenatal care: Care of the mother during pregnancy not only affects her own health but also has a bearing on neonatal and perinatal outcomes. There is evidence that antenatal interventions such as immunization against tetanus, iron supplementation, breastfeeding counselling, birth preparedness, control of maternal infections, recognition and treatment of danger signs positively impact on maternal

and neonatal outcomes. There is a wide variation in the quality of antenatal care provided in the countries of the Region. In 2005, it is estimated that 40% of women in the Region were left without antenatal care. In Afghanistan and Pakistan, where the majority of maternal and neonatal deaths take place in the Region, only 16% and 43% of women receive antenatal care, respectively [9].

Skilled attendance at delivery: An analysis of neonatal deaths in the Region reveals that almost one half of all neonates who die do so in the first week of life. Of these, two-thirds die during the first 24 hours. Many of those who die during the first week die due to causes like asphyxia that could have been averted or treated at birth by providing skilled attendance. There is a wide consensus that access to skilled care at birth is likely to improve pregnancy outcomes both for the mother and her baby. It is estimated some 54% of births in the Region were attended by skilled attendants in 2005, compared to 36% in 1990, around a 50% increase in this proportion in the period 1990 to 2005. However, less than 50% of deliveries were attended by skilled health personnel in four countries: Afghanistan, Pakistan, Somalia and Yemen, all countries with high maternal and neonatal mortality [9].

Other underlying causes

A woman's decision to seek health care is shaped by several factors, including the influence of her spouse or other family members, social norms, her education, her status in society, the severity of her illness, the distance she lives from the health facility, the financial and opportunity costs of seeking care, and her previous experiences with the health system and perceived quality of care. Socioeconomic factors also play a large role in maternal deaths: poverty, illiteracy, malnutrition and low social status of women are all underlying causes of maternal and neonatal mortality.

Poverty is an underlying cause of many neonatal deaths, either through increasing the prevalence of risk factors such as maternal infection or through reducing access to effective care. However, poverty is not just a problem in poor countries. It can also be a result of disparities between the richest and poorest of the population. In most cases interventions do not reach the poorest and most underserved to effectively reduce deaths. The average literacy rate for adult females in the seven countries with high maternal and neonatal mortality is 40%, compared to 56% for the Region as a whole [9]. A strong association exists between women's education or literacy levels and use of reproductive, maternal and child health services. Maternal and neonatal mortality levels are significantly higher in countries with high rates of female illiteracy and this is evident in the Region [1].

Family and community role in neonatal care

Skilled care alone at birth is not enough and, where available, is provided to only half of births in the Region. Care provided within the household is very important for newborn health. Adequate breastfeeding practices—including early initiation and exclusive breastfeeding, keeping the child warm and recognizing when to seek care can make a big difference in neonatal survival. Empowering mothers with the knowledge and skills needed to perform this caring role is largely inadequate in most countries. Health education and communication interventions, together with adequate community support, are essential to improve child health to address barriers to the desired behaviour.

In addition, cultural norms, that operate on a community level, penetrate household dynamics and may affect a woman's ability to regulate her fertility. Expectations of high fertility and large families as well as early marriage and early childbearing are encouraged in many settings, particularly among poor families where use of services is low and maternal mortality is still high. In some cultures, son preference influences fertility choices and behaviour to seek health care for infants. A woman may feel pressured to reproduce until she has at least one son, increasing her risk of pregnancy-related morbidity and mortality.

Health systems and human resources

To have a meaningful impact on neonatal health it would not only be necessary to ensure the presence of a skilled birth attendant at every delivery, or train other health providers on standardized clinical guidelines but also to provide health system support for ensuring a continuum in the availability of the necessary level of care from the community to the highest level of referral. Sustainable pre-service

training for future cadres of skilled health providers is essential, however most investment is made in in-service training alone.

Many countries suffer from weak health systems with inadequate financing and insufficient qualified health providers at all levels. Inadequate financing has led to lack of skilled providers, essential drugs, supplies and equipment necessary for maternal and neonatal care. Lack of supportive supervision also contributes to the low quality of services provided at all levels as well as the sustainability of interventions. This all has led to lack of access of mothers and newborns to good quality health services. Lack of emergency transportation for mothers and newborn infants contributes to the magnitude of the problem. Provision of effective referral services for mothers and newborn infants, particularly where they are most needed, is a prerequisite to reduction of maternal and neonatal morbidity and mortality. Finally, lack of reliable and consistent data has led to poor planning for cost-effective interventions and appropriate directing of available resources.

Political commitment to child health

Child health in general in the Region is affected by the political situation in countries as well as the level of political commitment. The Region has, for many years, been devastated by manmade disasters which have tremendously affected the health of the population in some countries, especially the vulnerable groups of children and mothers. The social and health impact of political instability, domestic crisis and economic sanction in the Region are well documented. This situation hampers greatly the progress towards the Millennium Development Goals.

There is inadequate allocation of financial resources to child health, insufficient qualified human resources and high turnover of qualified staff at all levels. Child health is a neglected priority on the health agenda of many countries losing out to other competing areas. Stated commitments to child health are often not translated into action. Clear, effective policies and commitment to action to ensure sustainability of achievements as well as mechanisms to assist monitoring of policy implementations, are lacking.

4. Current regional strategy

A comprehensive regional strategy is being pursued which addresses the different aspects of newborn health at different levels. This strategy comprises several components.

a) Safe motherhood imitative

Since the Nairobi Conference in 1987, the Regional Office has advocated the principles and necessary interventions for the implementation of the Safe Motherhood Initiative as a priority public health issue in countries of the Region. This initiative comprises four pillars aimed at strengthening the national capacity in maternal and neonatal health through antenatal care, essential obstetric care, postpartum and neonatal care and family planning. In 1988, the Regional Committee for the Eastern Mediterranean discussed and “noted with concern the high levels of maternal and infant deaths in some countries of the Region, and adopted resolution EM/RC35/R.9 Maternal and infant mortality in the Eastern Mediterranean Region–socioeconomic implications and urgent need for control”. In 1990, the Regional Committee adopted resolution EM/RC37/R.6, in which all countries of the Region were requested to aim at reducing maternal and child mortality by 50% by 2000 and to adopt all possible measures to achieve this target. Two approaches were determined in this resolution, namely: securing the availability of one trained birth attendant in every village and urban quarter, and reinforcing the technical support provided to Member States to achieve the goals of safe motherhood. Accordingly, in the period 1990–2005, the percentage of pregnant women and deliveries attended by skilled personnel increased from 28% to 60%, and from 36% to 54%, respectively.

b) Making Pregnancy Safer

The launch of the Making Pregnancy Safer strategy in 2000 was a significant step forward towards improving maternal and neonatal health in the Region. The adoption of the strategy is expected to accelerate the reduction of maternal and neonatal morbidity and mortality through improvement of the

availability, accessibility and utilization of essential maternal and neonatal health services and improvement in quality of these services. Resolution EM/RC51/R.4 Moving towards the Millennium Development Goals: investing in maternal and child health urged Member States which have not already achieved the targets set by the Millennium Development Goals for improvement of maternal and child health to develop the required national policy and strategy documents and expand upon the achievements already made by Member States. In order to technically support the national efforts aimed at improving maternal and neonatal health through formulating appropriate and effective strategies in countries of the Region, the Regional Office developed a regional framework as a guide/model entitled *Strategic directions for accelerating the reduction of maternal mortality in the Eastern Mediterranean Region*. This regional framework underlines six priority actions: achieving political commitment; promoting a favourable policy and legislative environment; ensuring adequate financing; strengthening the delivery of health care services; empowering women, families and communities; and strengthening monitoring and evaluation for better decision-making.

The Regional Office maintains close collaboration with countries for capacity-building of national staff in maternal and neonatal health. Intercountry activities have focused on a number of areas, such as the Mother-Baby Package which describes the effective minimum interventions of the four pillars of Safe Motherhood; data use for decision-making in maternal and perinatal health care; total quality management in maternal and perinatal health care; development of a reproductive health research directory; implementation of the Pan-Arab Project for Family Health; and collaboration with UNFPA in a strategic partnership programme.

c) Integrated Management of Child Health (IMCI)

IMCI is a primary child health care strategy to improve the health of children, both healthy and sick, including neonates, through health promotion and preventive and curative interventions; improving primary health care providers' skills in the context of a strengthened health system; and empowering communities to play an active role. The Regional Office for the Eastern Mediterranean was the first WHO Regional Office to introduce newborn management at primary health care level into the IMCI guidelines. Application of the guidelines has been shown to improve referral of severely sick newborn infants, promote newborn lifesaving interventions, such as keeping infants warm and immunization, promote breastfeeding, and improve care in the health facility [12,13]. Its community component enables care for neonates at home, early recognition of danger signs and when to seek care at health facilities, and preventive interventions, particularly breastfeeding.

Currently, IMCI is being implemented at various stages in 17 countries, two of which are on the way towards universal coverage, Egypt (87%) and Islamic Republic of Iran (95%). Monitoring and evaluation activities for IMCI implementation, such as follow-up visits and health facility surveys, show clearly the improvement in quality of health services provided to children under 5 years, including newborns. Training material in Arabic has also been developed on counselling on infant and young child feeding for physicians, who were identified as an important influence on mothers' breastfeeding practices [14]. Regional courses have been conducted using this material and currently courses are being conducted by countries at national level. IMCI has been introduced into the teaching curriculum of about 22 medical schools in the Region.

d) Child Health Policy Initiative

This regional initiative was born in response to Regional Committee resolutions to develop comprehensive child health policy documents, highlighting mechanisms to monitor the implementation of policies. This was felt essential to ensure commitment to child health (including of neonates) and allocation of financial resources, and to indicate strategies for implementation of public health interventions. Tunisia has officially adopted a child health policy in which neonatal health was given priority, including a policy of breastfeeding and strategies for caring for newborns at health facilities and home. Egypt, Morocco, Oman and Sudan are in the process of finalizing child health policy documents.

5. Conclusions and way forward

Millennium Development Goal no. 4, to accelerate the pace of decline in child mortality and to which all countries have committed, will be difficult to achieve unless stronger commitment and greater investment are made by governments and partners to improve neonatal health and reduce mortality. Political commitment to improve child health in general, and neonatal health in particular, is not yet at the strength necessary to galvanize action.

Neonatal health, neonatal care, maternal health, maternal care, socioeconomic factors, role of families and communities in caring for the newborn infant, health systems, human resources and political commitment are all major determinants of neonatal mortality. Families and communities are major players in improving neonatal health and reducing neonatal deaths. Sociocultural beliefs and related family practices are major determinants of neonatal health. Evidence-based, cost-effective interventions to improve neonatal health, whether delivered in the community or at health facilities are available. Such interventions vary from simple approaches to serve low-resource settings, to sophisticated skills and high-tech equipment in countries where mortality rates are low and these types of interventions are required. Significant impact on neonatal mortality rates can be achieved only if the poorest and most underserved are given equitable access to those interventions.

The handing over of responsibility for the newborn baby to child health services, typically from the midwife to the health centre, is a critical stage in the continuum of care. Newborn care often falls between the cracks. Maternal health services consider that their responsibility ends after childbirth or when the mother is discharged from hospital with her baby. Child health programmes, on the other hand, have been primarily aimed at preventing mortality in older children, focusing on vaccine–preventable diseases, diarrhoea and acute respiratory infections and less on the problems of newborns.

Health systems are still weak in many countries in the Region with poor capability to deliver quality health services to newborn babies. Services are often still delivered to mothers and children through vertical programmes, and health systems are not ensuring their integration at the service delivery level. Some other health system elements, particularly the health information system, require greater attention to become functional and useful for sound planning, monitoring and evaluation. Proper investment in pre-service education has the potential to produce in a sustainable way more qualified cadres of health providers.

WHO has an essential role in:

- guiding the process of policy and strategy development, with a specific focus on those aiming at achieving Millennium Development Goal no. 4;
- providing the necessary technical support to countries to ensure that strategies for neonatal care are guided by the core principle of ensuring a continuum of care, based on: 1) care to be provided throughout the life cycle, including adolescence, pregnancy, childbirth and childhood; and 2) care to be provided in a seamless continuum that spans the home, the community, the health centre and the hospital.
- strengthening of partnership among all bodies concerned with neonatal health, including ministries of health, international organizations, bilateral organizations, teaching institutions and the private health sector.
- promoting universal coverage of the effective strategies that address neonatal health, such as integrated management of child health and making pregnancy safer.

6. Recommendations to Member States

1. Renew their commitment to child and maternal health in general, and neonatal health in particular, by translating it into effective actions to fulfil their engagement to achieve Millennium Development Goal no. 4.

2. Highlight the priority position of neonatal health within their national child and maternal health policies and strategies, taking into account the relevant priorities in each country, selecting

appropriate cost-effective interventions accordingly and addressing disparities within the country to ensure reaching the most needy and equitable access to high quality health services for antenatal, newborn and postnatal care. Monitoring mechanisms should be in place to ensure the implementation of the policies and measure achievement of the set national goals.

3. Address neonatal health through a well coordinated health system approach, within the context of existing maternal and child health programmes and adopting a continuum of care strategy that avoids the creation of vertical programmes or initiatives or diversion of resources from post-neonatal to neonatal health.

4. Strengthen the health system, in particular the health information system, to be able to track neonatal indicators, which are crucial for sound planning, successful implementation of interventions and monitoring of achievements.

5. Ensure universal (100%) coverage with evidence-based and cost-effective interventions such as those under the Making Pregnancy Safer and Integrated Management of Child Health strategies, which contribute to human resource development, strengthening of the health system and community empowerment. Priority should be given to underserved populations and those in greatest need.

6. Introduce the IMCI guidelines into the formal teaching curricula of medical and paramedical schools to improve the quality of teaching and basic skills acquisition and to ensure sustainability.

7. Strengthen the vital registration system (birth and death certificates) to assist in validating the data available on neonatal mortality.

8. Provide due consideration to the role of the community as a major player in improving neonatal health and as an essential entry point to reduce neonatal mortality.

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