Maternal and child health: is South Asia ready for change?

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South Asia still has a long way to go to meet the United Nations' millennium development goals for maternal and child mortality

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BMJ 2004;328:816–9

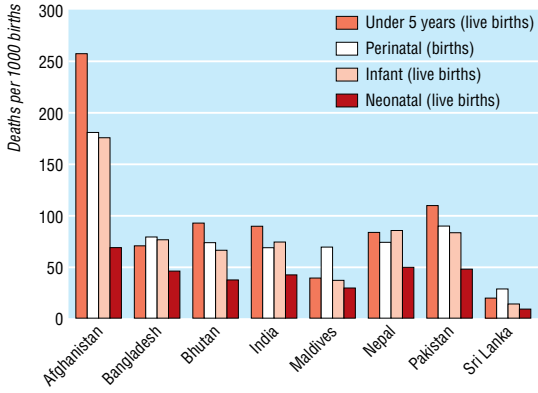
A review of maternal and child health in South Asia a few years ago revealed a sorry picture.[1] The region had persistently high rates of maternal and infant mortality that had largely remained resilient to change. In recent years, several countries in the region have seen relative prosperity, middle class affluence, and unprecedented economic development.[w1] It is uncertain, however, whether this has been associated with improvements in health, especially that of women and children, and whether the underlying determinants of ill health have changed. We review current maternal and child health in South Asia and suggest interventions that may make a difference.

Methods

We reviewed all available information on maternal and child health indicators in the South Asian region (Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka, and the Maldives). We also included Afghanistan, which is technically not part of the South Asian Association for Regional Cooperation, because of its strategic and geographical location. In addition to locally available published data and reports, we reviewed the available information from the World Health Organization, Unicef, and the World Bank. We also reviewed data on mortality and interventions from the Bellagio Child Survival Group and other recent intervention studies in the region.

Situational analysis

A global review of child deaths by the Bellagio Child Survival Group showed that 34% of child deaths occur in South Asia and that the region has almost two thirds of the global burden of malnutrition.[2] Of an estimated half a million maternal deaths worldwide, almost half occur in South and Southeast Asia.[3] Maternal mortality ratios range from 23/100 000 live births in Sri Lanka to 539/100 000 in Nepal.[4] Given the close relation between maternal and perinatal mortality, it is not surprising that perinatal mortality rates in the region also rank among the highest in the world. Table 1 summarises the current data on maternal and child health indicators in the region[w2-w5] and the figure gives mortality data for babies and young children in key countries in the region.



Death rates in children under 5 and perinatal, infant, and neonatal mortality in South Asian countries. Perinatal and neonatal mortality for Bhutan and Afghanistan were estimated from regional proportionate mortality

The close relation between maternal and neonatal mortality is explained by the paucity of primary care services, antenatal care, and intrapartum care. The main causes of maternal mortality thus include haemorrhage, obstructed labour, and a relatively high burden of infectious diseases.[w6] Major causes of neonatal mortality in the region include birth asphyxia, low birth weight, and high prevalence of serious infections such as neonatal tetanus, sepsis, and pneumonia.[5–7]

Malnutrition

Although large scale food shortages and famines are now uncommon, rates of maternal malnutrition in the region rate among the highest in the world. These are reflected as overt malnutrition with low body mass index as well as widespread subclinical micronutrient deficiencies.[8] Interventions directed at these micronutrient deficiencies have been shown to significantly reduce maternal[9] as well as infant mortality.[10 11] These findings may have important long term implications for health and development. Micronutrient malnutrition, such as iron and iodine deficiency during early childhood, may affect immunity, learning ability, and mental development in later life.

References w1-w16 and a table of effective interventions are on bmj.com

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Table 1 Comparative maternal and child health indicators in South Asia

Country	Population (1000s)	Estimated births (1000s)	Maternal mortality ratio	% of women with tetanus vaccination in pregnancy	% births with skilled attendants	Estimated % of low birthweight babies
Afghanistan	22 930	1 139	820	19	8	24
Bangladesh	143 809	3 504	600	85	13	30
Bhutan	2 190	76	500	73	15	—
India	1 049 549	24 489	440	73	34	33
Maldives	309	10	390	95	90	13
Nepal	24 609	82	830	65	9	27
Pakistan	149 911	5 349	200	51	19	25
Sri Lanka	18 910	328	60	91	94	25

Maternal malnutrition has also been shown to be associated with fetal malnutrition, and estimates of intrauterine growth retardation in the region range from 25% to 50%.[w7] Although a correlation has been shown between maternal malnutrition, placental volume, and birth weight,[12] this relation may be multifactorial. Low birth weight has been shown to be associated with poor maternal intake of green leafy vegetables and relatively high maternal energy expenditure and work load.[13]

High rates of maternal malnutrition and low birth weight may also underlie the high burden of non-communicable diseases in adult life, such as coronary artery disease, hypertension, and diabetes. In a recent landmark study of a birth cohort in Delhi followed until the age of 26 years, Bhargava et al showed that thinness in infancy followed by rapid weight gain in later childhood is associated with impaired glucose tolerance in adult life.[14] Thus the growing epidemic of chronic non-communicable diseases among adults in South Asia may have its origins in widespread malnutrition among women and children and changing lifestyles of the population.

HELDUR NECTONY

Lack of clean water contributes to high maternal and child morbidity

Infectious diseases

Outside the critical period of childbirth, a large proportion of child deaths are related to infectious diseases. WHO estimates that children under 15 years of age contributed 36% of total loss of years of healthy life globally in 2002, while children under 5 years accounted for 90% of these deaths.[w8] A large proportion (60%) of these deaths are related to communicable and vaccine preventable diseases. Although reported coverage rates for most vaccines included in WHO's expanded programme on immunisation (EPI) range from 67% to 99% in Southeast Asian countries,[w9] in reality vaccination coverage rates are much lower. The persistently high burden of diphtheria and whooping cough in the region reflects the poor ability of health systems to deliver vaccines. More importantly, in the context of the global polio eradication programme, the main residual pockets of polio in the world are in South Asia, with Pakistan and India reporting 90 and 1600 cases respectively in 2002.[w10]

The burden of diseases that are preventable by EPI vaccination pales in the wake of other childhood illnesses such as serious infections due to *Haemophilus influenzae* type B, *Streptococcus pneumoniae,* and hepatitis B virus. Although vaccines against these illnesses are available in most developed countries, they are a long way off being included in public health vaccination programmes in South Asia. In addition, recent threats of emerging infections such as dengue fever or multidrug resistant typhoid fever add another dimension to the existing burden of infections among young children.[15]

Determinants of maternal and child morbidity and mortality

The persisting high burdens of diarrhoeal disorders, acute respiratory infections, and hepatitis A and E in South Asia reflect the poor state of basic public health services, especially clean water and sanitation, and a general lack of hygiene awareness. Indoor air pollution due to poor housing, overcrowding, and use of organic fuels in confined spaces greatly contributes to respiratory infections among women and children in rural populations. Recognition is also increasing of the role of environmental degradation in South Asia and its contribution to adverse health outcomes. Rates of industrial pollution are high, with poor regulatory mechanisms and legislation for control measures. This is illustrated by reports of lead poisoning in some urban areas[16] and high rates of pesticide misuse and exposure in rural settings.

The immediate causes of high rates of poor maternal and child health in South Asia, however, are

Summary points

- Despite improved economic conditions in South Asia, most countries continue to have high maternal and child mortality
- Malnutrition, especially micronutrient deficiency, is widespread
- Underlying determinants such as female illiteracy, poverty, and lack of empowerment of women are major barriers to improvements
- Substantial improvements have been achieved in some places by focusing resources on low cost primary care strategies and tackling socioeconomic issues
- Such interventions need to be extended to whole health systems

underlain by more basic determinants. These include the poor status of women in society and the roles of poverty, illiteracy, and social inequity. Sri Lanka remains a remarkable exception as a result of the large and sustained investments it has made in providing primary health care and education to its population. This is especially reflected in the status of maternal health, with almost 94% of births in Sri Lanka attended by skilled health workers.[w11] In contrast 64% women in India do not receive any form of antenatal care and only 18% deliver in health facilities.[w12]

The poor social status of women and lack of empowerment contribute greatly to lack of fertility regulation and burgeoning population growth rates. This "feminisation of poverty" in South Asia is a fundamental anomaly that has impaired social development in the region. Sex inequity in health indictors is an almost universal phenomenon in the region and is evident in careseeking practices, referral patterns, and mortality indicators. In particular, recent demographic shifts in the population in north India indicate an unrecognised but important effect of abortion of female fetuses since ultrasonography became generally available in pregnancy.[w13 w14] These social barriers to development are compounded by the lack of safety nets and dysfunctional health systems that fail to provide basic services at grass root levels. In most instances widespread corruption, relatively centralised health policy making, and poor devolution to local governments lie at the core of the problem.

In some parts of South Asia, these social issues have been compounded by conflict and upheaval. The war in Afghanistan spanning 25 years, the Maoist uprising in Nepal, smouldering civil war in Sri Lanka, and the longstanding feuds between Pakistan and India have had huge impacts on the lives of people in the region. Though the war in Afghanistan had a direct effect on child mortality and displacement of large sectors of the population,[17 18] the disruption of families and forceful conscription as child soldiers in Sri Lanka's civil war has been equally disastrous. These children of war have the makings of a future generation that is at great risk of social dysfunction and impaired psychological development.[w15]

Despite these sobering issues that affect over 1.5 billion people, South Asia spends far more in arms and weapons than on health and education (table 2).[w2] A large proportion of the population still continues to pay directly for basic health care, and public sector spending on health and nutrition remains abysmally low.

Can something be done?

Although the current picture is gloomy, the resilience of the South Asian people and their ability to find solutions that may work for them gives cause for hope. The fundamental obstacle remains the willingness of the governments and policy makers to give due importance to and apportion resources for human development and public health. Investment in maternal and child health as a central focus of public health policy is critical and must lead to the development of evidence based policies and interventions.

All the countries of south Asia are signatories to the millennium development goal targets of reducing maternal and infant mortality by 66-75% by the year 2015.[w16] Given the recent progress and trends of investments in this area, it is unlikely that these targets can be met without a concerted effort. Lack of material resources cannot be regarded as the sole obstacle. Sufficient indigenous resources are available within the region, and a willing population can be targeted to tackle priority issues in public health. Some impressive examples from the region, such as Kerala and Sri Lanka, indicate that it is possible to improve maternal and child health.

A recent review of the evidence on interventions also suggested that existing cost effective strategies can help reach the millennium development goals of the region.[19–20] These include strategies to provide key micronutrients to mothers and infants,[9–11] effective breastfeeding and appropriate complementary feeding promotion strategies,[21] and community based models of perinatal and newborn care.[7] There are no quick fixes, however; sustained long term investment is needed to reduce the burden of morbidity and

Table 2 Health and related expenditure for South Asia

Country	Human development index	Gross national income/capita ($)	Per capita government expenditure on health in 2001 ($)	% of central government expenditure (1992-2001) allocated to			Overseas development assistance in 2001 ($m)
				Health	Education	Defence	
Afghanistan	—	250	4	—	—	—	402
Bangladesh	139	360	5	5	11	10	1024
Bhutan	140	590	8	10	15	—	59
India	127	480	4	2	3	16	1705
Maldives	86	2090	82	10	18	14	25
Nepal	143	230	3	5	15	5	388
Pakistan	144	410	4	1	1	18	1938
Sri Lanka	99	840	15	6	10	18	330

Further reading

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mortality among women and children. It is also important that these strategies be firmly based on the best available evidence about what is both cost effective and practical in the existing health systems. The table on bmj.com gives some examples of simple strategies that can help achieve the millennium development goals for South Asia.

The issues of access to services by poor women and children, and the equitable distribution of resources between urban and rural populations are fundamental to the success of such ventures. As India's second national family health survey suggests,[w12] providing contraception, improving the status and decision making power of women, counselling by peers, and improving quality of services are critical. Concerted implementation of cost effective interventions in a sustained manner may allow most countries of South Asia to reduce maternal and child mortality and morbidity to those observed in Sri Lanka and other parts of Southeast Asia.

Contributors and sources: All authors are actively involved in maternal and child health issues in South Asia. This article resulted from discussions between all authors and contributions based on reviews of the following areas: perinatal and newborn care, maternal health, malnutrition, infectious diseases, war and conflict, investments, and statistical trends.

Competing interests: None declared.

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(Accepted 8 March 2004)

Hindu mythology and medicine

My fascination with Hindu mythology dates back to my early childhood. Evenings then were generally dull, as we had no television in those days. One evening, however, I found one of my grandaunts telling stories from Hindu mythology to her grandchildren, and I was entranced.

By the age of 6, I knew the whole of *Bhagavatha*, which is the story of Krishna, an incarnation of the Hindu god Vishnu. When I was 7 years old my dad bought me an abridged version of *Mahabharatha*, one of the greatest epics of Hindu mythology. I read the whole book in a few days. I was intrigued and enchanted by all the stories in it, but one stood out in particular.

It is the story of a fisherman's daughter. She was very beautiful, but unfortunately she smelt of fish. One day a sage came along and fell in love with her. During their short lived affair the sage blessed her, which made her odour-free.

Years later, while reading Nelson's textbook of paediatrics, I came across the condition called trimethylaminuria. This condition is caused by a deficiency of the liver enzyme trimethylamine oxidase. Trimethylamine is formed in the intestine from choline in eggs, liver, and nuts, and trimethylamine oxide in fish. The enzyme converts the trimethylamine thus formed to its oxide, which is odourless. In the absence of the enzyme trimethylamine accumulates in the body and is excreted in the urine, and people with this condition smell of rotten fish. Treatment is simple dietary advice to avoid all foods that are a source trimethylamine. Obviously, our sage in the story knew the condition and its treatment.

I had never before looked at the Hindu myths with a medical eye. They were just flights of imagination, not true life stories. However, I now tried to make some sense out of them from a medical viewpoint. I found many other examples in *Mahabharatha*, such as infertility treatment, test tube babies, intrauterine surgery, and even neonatal resuscitation, but the story of the girl with trimethylaminuria remains my favourite.

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