Improving Access and Efficiency in Public Health Services: Mid-Term Evaluation of India's National Rural Health Mission

Non-Communicable Diseases

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CARDIOVASCULAR DISEASE is the leading cause of death in India. The epidemic of diabetes that has already begun in India has the potential to unravel the spectacular economic and social progress that has been achieved in recent decades. At least 30 million, perhaps even 70 million, Indian citizens have diabetes. The trends in dietary and activity patterns, seen in the increasing prevalence of overweight and obesity, will inevitably drive this number much higher. It is possible that prevalence of diabetes could become as high as half of the adult population. Although the exact genetic variants have not been identified, the evidence is clear that populations from south, East, and southeast Asia have a heightened susceptibility to diabetes when combined with unhealthy diets, low levels of physical activity, and smoking. In other words, those factors that lead to high rates of diabetes in European populations will lead to several- fold higher rates in Asian populations.

The degree of susceptibility that exists in the Indian population is not clear, but by any measure diabetes is set to become a devastating epidemic in India unless steps are taken to abate the causes. The underlying factors that make the urban prevalence so high are spreading to rural areas and our colleagues are noting the recent emergence of diabetes in some of those populations as well (Chow et al. 2006).

The reduction of cardiovascular disease, diabetes and most other chronic diseases is possible, but will require actions by the highest level of government and Indian society broadly, in addition to the healthcare system and Ministry of Health.

The morbidity and economic impacts of diabetes are mainly due to the many complications of this condition, including heart disease, stroke, kidney failure, blindness, and loss of limbs. These consequences have not yet been fully felt in India. The rise in diabetes has been quite recent and the complication rates rise directly with the duration of diabetes. For example, we have found that rates of fatal heart attacks are 3-fold higher among persons with diabetes for less than five years but 12-fold among those with diabetes for 25 or more years (Hu et al. 2001).

Even if the epidemic in India were arrested today, there would still be a huge increase in the complications over the next several decades. If the rates of diabetes increase further, there will be no healthcare system capable of caring for the complications and the disease and economic burden to society will be overwhelming. Attention to prevention will thus have major benefits. Further, the underlying causes of diabetes overlap greatly with those of cardiovascular disease and many cancers so the benefits will be very broad.

We know that the health of individuals is intricately woven into the complex fabric of society. We have evidence of this in Dr Ramadoss' work with the WHO Commission on Macroeconomics and Health. For example, the state of agriculture, natural resources, education, transportation, and fiscal policies each strongly determine health, and the health status of individuals strongly influences many of these domains. Highlighted below are some key areas where the Ministry of Health plays an important role, and where the leadership of the Minister of Health, coupled with the action of other Ministries can have strongly beneficial effects on the epidemic of chronic disease.

1. Controlling Smoking

We all know smoking has devastating effects on health. We applaud India's signing of the WHO Framework Convention on Tobacco Control and the many positive steps taken. Complete implementation will have enormous benefits. Educational and other efforts are underway, but increasing cost through taxation on tobacco products and the protection of non-smokers from secondhand smoke are powerful elements in an effective

control effort.

2. Promotion of Physical Activity

Like smoking, physical inactivity has deleterious effects on virtually every organ of the body, and the emphasis on automobiles for transportation has a particularly adverse effects on physical activity patterns of populations (and, of course, large adverse effects on pollution and global warming).

In a recent World Bank-Fogarty Institute review on priorities for disease prevention in developing counties (Jamison et al. 2006), we concluded that promotion of walking, bicycle riding, and public transport systems are among the highest priorities.

The development of safe and attractive routes for walking and bicycle riding by school children and adults of all ages stands out as an appealing and feasible proposal. While expressways have an established place in modern development, parallel development of inexpensive infrastructure for bicycles and pedestrians mandated by government, would promote safe cycling. The provision of regular physical activity by schools and educational efforts regarding physical activity by the Ministry of Health are important and laudable. A shift in national transportation and urban design policies to favor energy expenditure in getting about is an essential supplement in promoting an active population. Public transportation, such as that being developed in Delhi, also plays an important part in a balanced and health promoting transportation system, especially if stations are connected with safe bicycle and pedestrian routes. There are many other creative possibilities to promote walking, public transportation, and bicycle use, including economic incentives and disincentives.

3. Promotion of Healthy Food Habits

The promotion of healthy food choices requires efforts at all levels of government. However, we highlight banning of partially hydrogenated fats because this industrial process creates trans fats that are clearly related to heart disease and probably diabetes, and the amount commonly present in the vegetable ghee in India is the highest (about 50 percent) that we have seen anywhere.

A ban on trans fats has been enacted in Denmark, Brazil, Chile, New York City, and many other parts of the US (in New York City it is a ban on restaurant use of trans fat), with the provision of adequate time for conversion to alternatives. The choice of replacement oils can provide an opportunity to increase intake of essential omega-3 fatty acids, which are very low in many Indian diets. We note that mustard oil, a traditional oil in parts of India, is a particularly good source of omega-3 fatty acids, and regular use of mustard oil has been associated with particularly low risk of heart disease in a study in Delhi and Bangalore.

We also specifically mention restrictions on the promotion of soda and other sugar-sweetened beverages because these contribute directly to obesity and diabetes, and promoting their use, especially in children, should be stopped in the midst of an epidemic of diabetes. We are aware that such a restriction has been proposed by the Ministry of Health. But according to the press, it is being resisted by other ministries, with the rationale that this would result in loss of income. This does not take into account the huge costs of treating diabetes and its resulting disabilities. Also, beverage companies elsewhere are profiting from selling water and other sugar-free beverages as alternatives.

4. National Campaign on Whole Grains

The high intake of refined grains and sugar should be reduced in India because of the rising rates of diabetes. Many traditional Indian foods are based on whole grains, but these are rapidly being replaced by refined grains. This is a complicated issue because refined grains are often associated in people's minds with progress and wealth. A sustained campaign needs to be supported by setting good examples. For example government events, including the most important state banquets, could serve only whole grains. Economic incentives and taxes could also be used to promote whole grain consumption.

5. National Policy on Grains with Folic Acid and Vitamins

There is now clear evidence that increasing folic acid intakes will reduce risk of stroke (Wang et al. 2007) and also severe birth defects related to the central nervous system. This issue is complex, but folic acid and vitamin B-12 deficiency are likely to be widespread in India. A national commission to guide policy would be a good first step, and an important immediate function would be to develop data on the prevalence of deficiency. subsistence farmers would not be reached by a fortification policy, and this needs special consideration as part of an overall strategy.

6. Management of Hypertension

Reduction of blood pressure will reduce the risk of cardiovascular disease, especially stroke. Collection of regional surveillance data on prevalence and treatment of hypertension, and on salt and potassium intake, should be a high priority and would not be expensive. A standing commission to develop and evaluate standard, low-cost protocols for management of hypertension in poor communities would help. Particular attention should be given to diet and other non-pharmacologic approaches which have other benefits, as well as to inexpensive and effective drugs.

It is important to note here the very encouraging results of the McMaster university trial led by Dr Salim Yusuf of a polypill with a combination of ingredients to address several cardiovascular risk factors in the one tablet, including high blood pressure and high cholesterol. The possible widespread benefit of a cheap, widely available preventive pill is of potentially great interest to the Indian Health Ministry and the Indian population, especially in rural areas where access to specialist medical services is more restricted.

7. Tackling Alcohol Abuse

Recognition of the issue of alcohol abuse as an increasing problem with multiple effects suggests the value of a standing commission with representation from several ministries. Attempts have been made worldwide to achieve reductions in alcohol abuse through education, social awareness, legal restrictions on access, and financial cost through taxation and penalties. Specific Indian research may recommend the approaches most likely to succeed in this varied population.

In its February 2008 meeting, the IAP recommended that the Prime Minister chair an inter-ministerial group on India's nutritional challenges—sub-populations with chronic under-nourishment as well as the rapid rise

of disease from obesity, diabetes, and the “urban/industrial lifestyle”. This inter-ministerial group is crucial in progressing on the above recommendations since clearly several different governmental ministries play a significant role in dealing with India's nutrition challenges. The group would include ministries involved in public health and family welfare (Ministry of Health and Family Welfare), urbanization (Ministry of Urban Development), nutrition (Ministry of Women and Child Development), rural development (Ministry of Rural Development), transport (Ministry of Roads, Transport and Highways), and the food sector (Ministry of Agriculture) to give a widely based approach to the multiple challenges facing India in achieving healthy nutrition.

We are aware that implementation of the above actions is politically complicated and has many economic implications. However, we are certain that with known modifications to diet and lifestyle, diabetes and heart disease can be significantly reduced, and many cancers prevented, while also enhancing the quality of life for India's people.

8. Malaria in India

Malaria has been a major health problem in India for centuries and has had an interesting epidemiological profile during the past eighty years.

During the 1930s the annual incidence of malaria was as high as 75 million cases with an estimated 800,000 deaths. “There was no aspect of life in the country that was not affected by malaria.” The annual economic loss at the time due to malaria was estimated as Rs 10,000 million. As a result of such significant health and economic burden, the Indian government had launched a National Malaria Control Programme (NMCP) in 1953 and within five years, the program interventions were able to bring down the incidence of malaria to two million cases.

Following the initial success, the government started a campaign of National Malaria Eradication Programme (NMEP) in 1958 which was based on total coverage by the application of indoor residual spraying with DDT and an extensive and intensive surveillance system based on the WHo Malaria Eradication Guides and Protocols. The eradication program was very effective such that by 1965, the incidence of malaria dropped significantly to a mere 50,000 cases per year. However, the success of the eradication effort was not sustained due to shortage of DDT, vector resistant, and operational and technical problems. By 1970, the number of malaria cases started to rise up to the pre-eradication level and a total of 6.5 million cases were recorded in 1976. To address the resurgence of malaria, a number of operational plans were introduced and since 1984, the number of malaria cases has been reduced to the two million level and an estimated 1,000 deaths per year.

At present, the National Vector Borne Disease Control Programme (NVBDCP) is responsible for the control of malaria, lymphatic filariasis, kala azar, dengue, Japanese encephalitis, and chikungunya, which are the major public health concerns of the country. The NVBDCP directorate is decentralized and has the necessary guidelines for the prevention and management of malaria and the other five diseases.

8.1. Malaria Control

The malaria control program in India has the following elements:

1. There is a network of peripheral malaria workers at all levels that provide appropriate prevention and case management.

2. At community level, the accredited social health activists are empowered to distribute insecticide treated nets, use Rapid Diagnostics Tests (RDTs) for the diagnosis of malaria and treatment of cases with artemisinin-based combination therapy (ACT) anti-malarias.
3. NVBDCP has a strategic plan for the implementation of package of interventions following the Roll Back Malaria Global Strategy. The interventions include indoor residual spraying (IRS), long lasting insecticidal nets (LLINs), rapid diagnostic kits for malaria diagnosis, and case management with ACTs.
4. For treatment of plasmodium vivax, a 14-day regime of primaquine is used.
5. The NVBDCP gets technical support from the National Institute of Malaria Research (NIMR) relating to issues of anti-malarial drugs and insecticides effectiveness monitoring. It also receives scientific support from the Indian Council of Medical Research (ICMR) on the formulation of evidence-based policies.
6. The surveillance system is based on the collection of blood smears from 10 percent of the population in all areas irrespective of endemicity. The system is referred to as annual blood examination rate (ABER) and the slides are collected by active case detection (ACD) and passive case detection (PCD). Thus about 90–100 million blood smears are collected every year in order to determine the prevalence of malaria. What is more, the information collected by ACD and PCD are not analyzed separately.

8.2. Recommendations

The following recommendations are offered to control the occurrence of malaria in India:

1. The current policy of surveillance is based on PCD and ACD with a target of 10 percent ABER. It is recommended to update the surveillance system to be based on PCD alone. This would be cost effective as the PCD data would be generated from routine surveillance. ACD would be useful for epidemic detection or in those areas with poor access to PCD.
2. There has been a steady increase in the distribution of LLINs but has not reached a level of universal coverage. Only 15 million nets had been distributed by 2006. Every attempt should be undertaken to increase the coverage to at least 80 percent.
3. It will be critical to support ASHAs to provide community-based malaria control interventions. They should receive regular technical support and supervision.
4. The system of quality control on diagnostics through microscopes/RDTs needs to be strengthened.
5. The fact that the annual incidence of malaria has stabilized at two million cases and a death rate of 1,000 seems to be under reported. *Plasmodium falciparuim* with a proportion of 45 percent is still high. Every effort should be made for the population to have ready access to diagnostics (microscopy or RDT) and ACTs, including empowering ASHAs to use RDTs to diagnose and either refer and/or treat malaria.

9. Recent IMR and MMR Data

According to the latest figures released by the Registrar General of India (RGI) in May 2009, as per the sample Registration system the IMR in India went down from 57 to 55 per 1,000 live births between 2006 and

2007. While the overall figure has shown a decline, the number has gone up in Chandigarh, Uttarakhand, the Andaman and Nicobar Islands, and some northeastern states.

The IMR has gone up from 23 to 27 per 1,000 live births in Chandigarh and from 31 to 34 in the Andaman and Nicobar Islands. In uttarakhand, the number of children dying per 1,000 live births has gone up from 43 to 48, in Manipur from 11 to 12 and in Meghalaya from 53 to 56. similarly, the IMR figure has shown an upward trend in Nagaland to 21 from 20 in the previous survey, from 33 to 34 in Sikkim, and from 36 to 39 in Tripura.

Strangely, while Manipur had an IMR of 11, both in rural and urban areas, the latest statistics show that the figure has gone up to 13 in rural areas and fallen to nine in urban areas. However, it continues to have the lowest IMR followed by Kerala at 13.

The worst performers, despite an improvement, continue to be MP at 72 followed by Orissa at 71, UP at 69, Assam at 66 and Rajasthan at 65. The other states whose performance is not satisfactory are Chhattisgarh (59), Bihar (58), Haryana (55), Gujarat (52), and Jammu and Kashmir (51).

The rural-urban divide is also visible in the data. The IMR in rural India is 61, while it is 37 in urban areas.

9.1 Focus on Reducing Neo-Natal Mortality

The neo-natal mortality rate (NMR)[1] for India was estimated at 39 (NFHS-3 2005–06) and singularly contributes to about 25 percent of the total newborn deaths in India. This implies that nearly two-thirds of all infant deaths and about half of all under-five childhood deaths occur in the neonatal period. Hence focusing on prevention of neo-natal deaths can go a long way in reducing child mortality. Neo-natal deaths (deaths among live births during the first 28 completed days of life) may be subdivided into early neo-natal deaths, occurring during the first seven days of life, and late neo-natal deaths, occurring after the seventh day, but before 28 completed days of life (WHO 2001).

The early neo-natal mortality rate (ENMR) in India was about 32 per 1,000 live births. This means that approximately three-fourths of neonatal deaths, half of infant deaths and one-third of under-5 child deaths occur within the first seven days of life. One must also note that the reported figures on early neo-natal deaths may be lower than actual numbers as parents are reluctant to reveal the birth and subsequent death of their babies given that there is such a high death rate of newborn infants. In many communities a child is not assigned a name till he or she has survived a few days or even weeks to avoid the embarrassment and guilt in the event of death.

Neo-natal deaths are caused by neo-natal tetanus (NNT), neo-natal sepsis (NNS), including septicemia and pneumonia, birth asphyxia, and premature birth (National Neonatology Forum 2004). Some of these causes of neo-natal deaths can be dealt with through large-scale maternal tetanus toxoid immunization programs, increase in institutional delivery and skilled attendance and indirect benefits through birth spacing.[2]

NFHS II reported the mean age at first birth among 25–29-year-old women as 19.6 years. NMR in mothers under 20 years of age at delivery (63 per 1,000 live births) was almost one-and-a-half times that of mothers who were 20–29 years old (41 per 1,000 live births). The mean age of marriage in most districts of UP, for instance, is around 16 (Mohan, 2004) and mean age at first birth is likely to be less than the national average increasing the risk of neonatal mortality.

According to the DLHS-3 data for 2007–08, there appears to be significant increase in several critical indicators relative to what these were in DLHS-2 in 2002–04. For instance, rural institutional deliveries went up from

29.8 percent in 2002–04 to 37.8 percent in 2007–08; 12–23 months fully immunized rural children, went up from 40 to 50.6 percent; mothers who consumed 100 IFA tablets went up rapidly from 16.9 to 47.4 percent; PHCs providing 24 × 7 services (53.1 percent), PHCs conducting at least 10 deliveries in a month (38.5 percent), breastfeeding within one-hour of birth for rural infants went up from 25.1 to 39.4 percent; presence of second ANM in sub-centers (19.8 percent); setting up of VHSCs (29.2 percent); presence of ASHAs in 12,678 villages, and JSY beneficiaries (13.9 percent). on the other hand, rural mothers who received full ante-natal check-up rose merely from 12.8 to 14.9 percent. It is surprising to note that DLHs-3 reports lower percentage of mothers whose blood pressure was measured relative to DLHs-2—fell significantly from 50.2 to 37.2 percent. This is all the more surprising since pregnancy- induced hypertension is one of the key issues in rural India.

Similarly, the RGI's office has released the MMR data for the period 2004–06. MMR is down to 254 from 301 in 2001–03. states like West Bengal, Andhra Pradesh and Tamil Nadu have reported the highest percentage decline. The performance of Bihar, Orissa, Rajasthan, UP and MP is also significant. The results from Punjab and Haryana, however, are disappointing as they actually show an increase in MMR during this period.

Notes

1. The neo-natal period commences at birth and ends at 28 completed days after birth. Neonatal mortality rate (NMR) refers to number of deaths among live births during the first 28 completed days of life per 1,000 live births.

2. NFHs II data shows that NMR was 50 percent less if the birth interval was 2–4 yrs compared to that if the interval was less than two years (36 and 71 percent, respectively).