

National health programs in the field of endocrinology and metabolism – Miles to go

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ABSTRACT

The endocrine and metabolic diseases of childhood obesity, diabetes mellitus, hypertension, iodine deficiency disorders, vitamin D deficiency, and osteoporosis are major public health problems. Different programs including National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke address these problems although some are yet to be addressed. National surveys have shown high prevalence of these disorders and their risk factors. Most of the programs aim at awareness raising, lifestyle modification, (primary prevention) and screening (secondary prevention) for the disease conditions as these are proven to be cost-effective compared to late diagnosis and treatment of various complications. Urgent concerted full scale implementation of these programs with good coordination under the umbrella of National Rural Health Mission is the need of the moment. The referral system needs strengthening as are the secondary and tertiary levels of health care. Due attention is to be given for implementation of these programs in the urban areas, as the prevalence of these conditions is almost equal or even higher among urban poor people where primary and secondary prevention measures are scarcely available and treatment costs are sky-high.

Key words: Diabetes, endocrinology, iodine deficiency disorders, national programs, surveillance

INTRODUCTION

The prevention and control of diseases of public health importance is the major goal of National Health Programs. Since independence, there have been many national programs that have concentrated on issues such as population stabilization, maternal and child health, malaria, filariasis, tuberculosis, leprosy, and HIV. Most of the programs were vertical (i.e.) separate health structures and personnel with strong central management catering to the control of those individual problems. Some amount of integration happened as and when the target levels of the programs were achieved, but many continued to

remain as vertical. Realizing the disadvantages involved in vertical programs, such as separate cadre of health staff, use of limited resources for specific activities only, and the reliance on donors for funding, planners and policymakers suggested and also succeeded in integrating most of these programs under the broad umbrella of the National Rural Health Mission (NRHM) started in 2005.^[1]

Through such vertical and integrated programs, we have tackled important diseases such as small pox, leprosy, guinea worm infection, trachoma etc., Revised National Tuberculosis Control Program (RNTCP) recently achieved complete nationwide coverage of DOTS in 2006.^[2] India has not had a case of wild poliovirus since 13 January 2011 and is declared to be non-endemic for Poliomyelitis.^[3] Even the incidence and prevalence of dreadful disease of HIV/AIDS has been brought down through the sustained effort of National AIDS Control Organization (NACO).^[4] As we slowly gain control over the communicable diseases, the incidence and prevalence of non-communicable endocrine diseases such as obesity (especially in childhood), diabetes mellitus, hypertension, hypercholesterolemia,

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iodine deficiency disorders, vitamin D deficiency, and osteoporosis are increasing rapidly and already reached the proportion of major public health concern.

Cardio Vascular Diseases (CVD) are the number one cause of death globally. An estimated 17.3 million people died from CVDs in 2008, representing 30% of all global deaths. Over 80% of CVD deaths take place in low- and middle-income countries.^[5] By 2025, India will have the highest incidence of diabetes and heart disease in the world, and CVD will be the leading cause of death and disability in India.^[6]

Obesity, diabetes, hypertension, hypercholesterolemia, which are endocrine and metabolic disorders, are the most important predisposing factors for CVD and Stroke. The prevalence of obesity doubled between 1980 and 2008 in every region of the world. A recent statistics reveals that 1 in 3 adults has hypertension and 1 in 10 has diabetes.^[7] Prevention of CVD and stroke involve prevention of the afore-mentioned conditions.

SURVEILLANCE OF RISK FACTORS OF NON-COMMUNICABLE DISEASES

So far in India, disease surveillance has been predominantly focused on communicable diseases. Although there were some efforts during the ninth and the tenth five-year plans, only in the draft of the 11th five year plan, was there a mention of an objective on surveillance for NCD risk factors.^[8] Integrated Disease Surveillance Project (IDSP) was launched in November 2004 to detect and respond to disease outbreaks quickly. Under IDSP, regular periodic surveys were planned for NCD risk factors such as anthropometry, physical activity, blood pressure, tobacco, nutrition etc.

The phase I of NCD risk factors survey was carried out in 2007-08 among the population aged 15-64 years in seven states namely AP, Kerala, MP, Maharashtra, Mizoram, TN, and Uttarkhand. The report of this survey gave baseline data on NCD risk factors among Indian Population.^[9] But, the phase II and III risk factor survey among the rest of the states is not yet initiated.

Realizing the high prevalence of NCD risk factors in India, the cabinet committee in 2010 approved the National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS). The main strategies under this program are prevention of risk factors through behavior change communication, early diagnosis and treatment, capacity building of human resource, surveillance, monitoring, and evaluation.^[10]

In South East Asian region, around 50% of people who have diabetes in the population are found to be undiagnosed.^[11] A hospital-based cross-sectional study in 10 states in India found the prevalence of undiagnosed diabetes to be 7.2% and that of undiagnosed hypertension to be 22.2%. The earlier a person is diagnosed and managed for these conditions, the better the chances of preventing harmful and costly complications.^[12] The NPCDCS focus on screening the population both in the community as well as in the health centers, both public and private to diagnose them early. This is an important secondary prevention measure.^[13]

Kerala was the first state to implement NCD prevention and control program in 2008-09 at the primary and secondary care level with emphasis on prevention, early diagnosis, management, building up of a suitable referral system, and strengthening of tertiary care centers.^[14]

In Tamilnadu, free State wide Adult NCD risk profiling (above 30 years) is done using a risk scoring (ENN score) by village volunteers, and individuals obtaining less than 30 score are advised to attend the village level screening camps for detecting diabetes and hypertension. The identified cases are entered into a Primary Health Center based registry and are managed further as per protocols.^[15] Since health is a state affair, the other states must try to implement similar program and tailor it to their local prevalence and practices.

The program must ensure continuous supply of quality diagnostic kits and drugs for the people who are positive by screening tests.^[16] Screening for complications of diabetes and hypertension must start from primary health center level, and there must be a referral system for diagnosing and managing complications at secondary and tertiary levels of health care. Since treatment for these conditions once started have to be continued lifelong, the program should maximize its effort in primary prevention or at least postponing the onset of these conditions. Also, the basic drugs are to be given free of cost in the Government health centers (already followed in few states), and management of complications must be covered under the Government-sponsored health insurance schemes for those who can't afford. In Tamilnadu, for management of complications, most of the procedures are covered under "the Chief Minister's Comprehensive Health Insurance Scheme," thus serving equity.^[17]

The Indian Council of Medical Research has recently started the India Diabetes study (INDIAB) to find out the true prevalence of diabetes and pre-diabetes, and also that of hypertension, dyslipidemia, coronary artery

disease (CAD) among both rural and urban people in all 28 states and 2 Union Territories of India.^[18] This data would immensely help in future planning and implementation of NPCDCS program.

CHILDHOOD OBESITY: AN OPPORTUNITY FOR PRIMARY PREVENTION OF CVD

The NPCDCS program does not have any specific strategy for prevention of childhood obesity. Various studies have proven that community-based interventions in term of health-promoting environment, healthy public policy, improved organizational practices, and capacity building of children will reduce unhealthy weight gain, and thus the prevalence of overweight and obesity.^[19-21] The NPCDCS focuses on creating awareness on increasing physical activity and avoiding unhealthy food items.^[10] Childhood obesity screening is done under School Health Program, but for the follow up care of obese children, no specific programs are available. To prevent childhood obesity, a support system from school administration is also extremely important. The school athletic activities and hours of physical training classes have to be strictly regulated. Nutrition standards of foods and beverages sold in school canteen and nearby neighborhood have to be strictly monitored.

Strict implementation of healthy public policy in terms of ban on advertising high calorie, low nutrient processed food and carbonated beverages in media, and extra taxes on these food items may be considered. These nutritional regulations may also need to be included under the Food Safety and Standards Act, 2006.

GESTATIONAL DIABETES MELLITUS

Gestational Diabetes Mellitus (GDM) is associated with an increased risk of perinatal morbidity for the mother as well as the newborn.^[22] The prevalence of GDM in South India varied from 9.9% in rural area to 17.8% in urban areas.^[23] Screening and management of GDM is an unique example of primary prevention of type 2 diabetes for the mother and primordial prevention of the condition in the child.^[24] Realizing the increasing prevalence of this condition and the possibility of early screening, the Health Department of the Government of Tamilnadu has initiated universal screening of GDM among all antenatal women by means of single blood glucose test 2 hrs post 75 g of glucose in all the three trimesters since 2007.^[25] This initiative was hailed as first of its kind in the world at the conference on Diabetes and Pregnancy in Istanbul, Turkey.^[26] Health providers at all levels of health care are trained in screening and managing the condition. This can be considered as a

pilot phase and taken up into the Reproductive and Child Health (RCH) Program for implementation in other states.

DIABETIC RETINOPATHY

Diabetic Retinopathy (DR) affecting eye is a common complication of diabetes, which can lead to blindness in chronic diabetic patients. DR is often asymptomatic until visual loss develops. Prevention, identification, and treatment of DR are needed at the earliest to prevent vision loss.^[27] The World Health Organization under its VISION 2020 initiative aims to control eye diseases, and DR is one among them.^[28] The National Program for Control of Blindness (NPCB), which was a cataract-centric program till few years ago, has started funding for management of other common conditions of blindness including DR through Public Private Partnership.^[29] It recommends hospitals specialized in diabetes to screen for DR among all new and existing diabetic patients and for diabetes in all eye hospitals. Exclusive screening camps for DR need to be held in both rural and urban areas. At the primary level, training of physicians and ophthalmic technicians in fundus photography and diagnosis of DR will be a necessary step in early diagnosis of DR. Awareness about this condition needs to be created among Non-Governmental Organizations (NGO) as well as the public.^[27]

DIABETES AND TUBERCULOSIS

More than 370 million people worldwide are having diabetes now, and the incidence is increasing, of which 90% are type 2 diabetes. People with diabetes have a three-fold risk of developing active Tuberculosis (TB). Diabetes worsens the course of TB and affects the outcome of treatment. Conversely, TB worsens the glycemic control in diabetics, and around 10% of TB cases globally are linked to diabetes. Worldwide, the incidence of diabetes is increasing, and this is expected to have a negative effect on TB control and *vice versa*. The sad part is that a large proportion of people with these 2 conditions are undiagnosed or diagnosed too late. WHO has suggested establishment of a means of coordinating the 2 disease activities and surveillance for prevalence of TB among diabetics in medium and high burden countries and of diabetes prevalence in TB patients in all countries and manage them properly.^[30,31] Based on the findings from a pilot project by The Union on feasibility and impact of screening of TB patients for DM in 8 Tuberculosis Units, RNTCP instituted screening TB patients for DM and hypertension countrywide from September 2012 and link them to appropriate treatment services where necessary. A similar pilot project to assess the feasibility and challenges of screening DM patients

for TB within the health care setting is underway at 6 DM clinics in tertiary hospitals across India.^[32]

IODINE DEFICIENCY DISORDERS

IDD constitutes a major nutritional deficiency disorder in India. Every stage of human development is affected by iodine deficiency. Realizing that goiters are only the tip of the iceberg, the nomenclature of National Goiter Control Program (NGCP) of 1962 was changed to National Iodine Deficiency Disorders Control Program (NIDDCP) in 1992. Under this program, universal iodization of salt was made compulsory for consumption. Production and distribution of iodized salt improved and its quality monitored at production, sale and consumption points, baseline surveys, and resurveys were conducted to assess the status of goiter/IDD through goiter surveys, urinary iodine excretion of antenatal women or children 6-12 years of age, and efforts were taken to increase the awareness on IDD and iodization of salt among public.^[33]

Government of India (GOI) mandated universal salt iodization in 1984. Repeat surveys conducted after introduction of iodized salt by ICMR^[34] have shown a significant reduction in total goiter prevalence in all the age groups in endemic areas and also a lowered incidence of neonatal hypothyroidism. Seeing the result, GOI imposed ban on the storage and sale of the non-iodized salt in 1997. In spite of these measures, almost 86% of the districts surveyed (283/310) in all states, and UTs in India in 2000 were found to be endemic for IDD. When the ban was lifted in 2000, there was a sharp decline in the use of iodized salt, and so the ban was re-imposed in 2006. Now the program aims to sustain production and quality of iodized salt and improve utilization through IEC activities.^[35]

Another initiative planned but yet to get implemented under the program is to screen children for growth disorder, school performance, sub-clinical hypothyroidism, and autoimmune thyroid disease.^[36]

Maternal hypothyroidism is known to cause premature birth, miscarriage and toxemia of pregnancy, and reduced intellectual function in the offspring. These risks are greater in women with overt hypothyroidism compared to sub-clinical hypothyroidism.^[37] But, the debate on universal screening vs. aggressive case finding for thyroid disorders among antenatal women is still ongoing, as there are less number of studies to support the former. However, it is proven that women with overt hypothyroidism have lower adverse pregnancy outcomes when they are detected and treated early in their pregnancy, although the same does not hold good for sub-clinical hypothyroidism. This makes

it clear that the RCH Program should take initiative to screen at least high-risk antenatal women (women with known thyroid disorders or with symptoms of the same or bad obstetric history or infertility or any autoimmune disorders or with family history of thyroid disorders) for thyroid disorders.^[38,39]

NEWBORN SCREENING AND ENDOCRINE DISORDERS

Two most important endocrine conditions, which fulfill the criteria for newborn screening, are congenital hypothyroidism (CH) and congenital adrenal hyperplasia (CAH). CH, if undiagnosed in the first few weeks of life, has serious detrimental consequences on the neurological development of the child and hence is one of the most common preventable causes of mental retardation. CAH may lead to life-threatening salt crisis if not diagnosed in the early neonatal period. Both the conditions are amenable for cost-effective treatment with excellent long-term outcome. In this background, ICMR conducted a pilot, multi-centric study recently for assessing the prevalence and feasibility of implementation of newborn screening for CH and CAH. The preliminary results of the study reveals an alarmingly high incidence of 1 in 900 for CH and 1: 2000 for CAH, respectively, both of which are much higher than in other countries that have already implemented universal newborn screening program. The study clearly shows that the prevalence of CH warrants a nationwide newborn screening program.^[40]

BONE HEALTH: VITAMIN D DEFICIENCY AND OSTEOPOROSIS

Though India is a tropical country with abundant sunshine, severe vitamin D deficiency is documented in all age groups (especially post-menopausal women) in several studies from different parts of India. In 2000, a study by AIIMS showed that up to 90% of apparently healthy subjects were having hypovitaminosis D.^[41] A study in north India showed high prevalence (84%) of VDD among rural and urban pregnant women and maternal 25(OH) D correlated positively with cord blood 25(OH) D.^[42] The prevalence among post-menopausal women was found to be 70% in a south Indian study.^[43] Calcium intake is also significantly low in the studies from our country.^[42] Protein energy malnutrition and social factors like early, multiple pregnancies along with the above two bone-specific factors contribute to significant osteoporosis in the post-menopausal women in India. Osteoporosis, which is seen as disease of the elderly, has its origin in the pediatric/adolescent age group.^[44] Correction of VDD and adequate calcium intake in the first three

decades of life helps in achieving maximum peak bone mass and play an important role in prevention of osteoporosis and fractures in the elderly.^[45] Osteoporosis is otherwise a silent condition, which is diagnosed only if the patient, usually post-menopausal women, fractures. For those in the middle age, screening with osteoporosis risk factor analysis and use of fracture risk scoring might help in identifying high risk individuals, thus serving early detection.^[46] Apart from the above measures, raising awareness about the condition is vital in prevention of osteoporotic fractures among general population. Recent studies reveal that vitamin D deficiency not only leads to skeletal health problems like rickets in children and osteomalacia in adults but is also linked to a variety of extra-skeletal health problems including hypertension, cardio vascular diseases, type 2 diabetes mellitus, autoimmune disorders, tuberculosis, osteoarthritis of large joints.^[47]

The problem being so widespread, the need for a national food fortification program to improve the vitamin D status of the whole population becomes a public health emergency. Policies on screening for VDD and supplementation of vitamin D along with calcium is to be framed at least for the vulnerable group such as pregnant and lactating women, infants and elders >60 as it is beneficial for both skeletal and non-skeletal health.^[48]

SUMMARY

NPCDCS program is currently in the pilot phase in most states of India. Full-fledged implementation of this program would pave way for the prevention and control of many of the chronic endocrine and metabolic disorders. Also, there is an urgent need for coordination among various programs – RCH, RNTCP, IDSP, NBCP, NIDDCP, School Health Program etc., that cater to different endocrine and metabolic problems with the NPCDCS under the broad umbrella of NRHM. Even the National Urban Health Mission (NUHM) needs to be strengthened as many of the above services are yet unavailable for the poor urban people who otherwise have to spend huge amounts as out of pocket expenditure for these chronic conditions in order to serve equity.

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